

Rapid DNA Profiling of Samples Collected at the Booking Station

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Rapid DNA

CBI participated in a pilot project with 2 other labs to test the GE rapid instrument in 2015/2016.

An opportunity was given to CBI to test an updated version of the rapid instrument by ANDE™ in 2017.

This presentation will be an overview of the 2017 project in addition to a comparison between the two instruments.

Collection of Samples

A local booking station collected approximately 100 samples over a 2 week period.

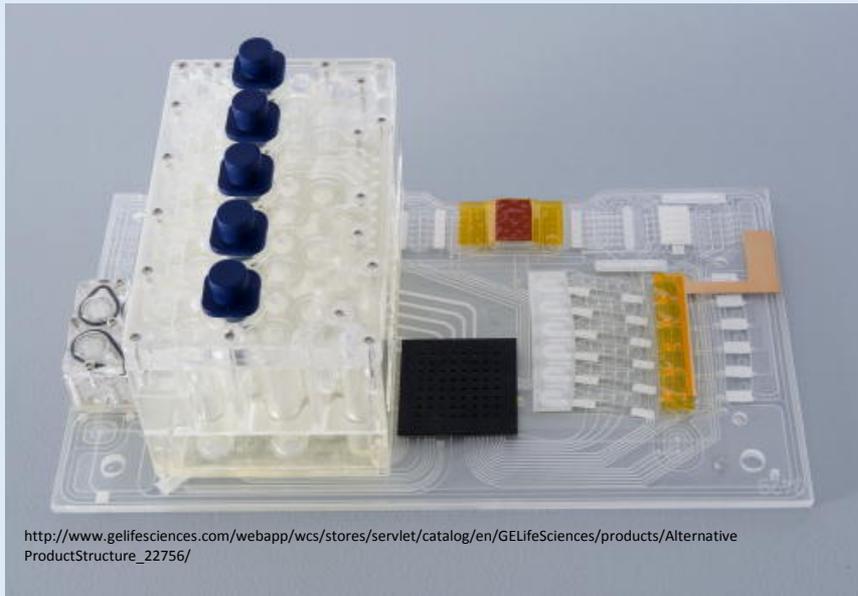
The staff was trained for less than 10 minutes on sample collection but had prior experience collecting Rapid DNA Samples.

Each sample was collected after the required adult felony arrestee sample was taken.

Swabs were stored at room temperature and labeled with identifying information.

Instrument Basics

A (Arrestee)-Chip



Swab with a unique RFID Tag including two attached desiccant packs



Each A -Chip allows for up to 5 samples

Chemistry of Chip

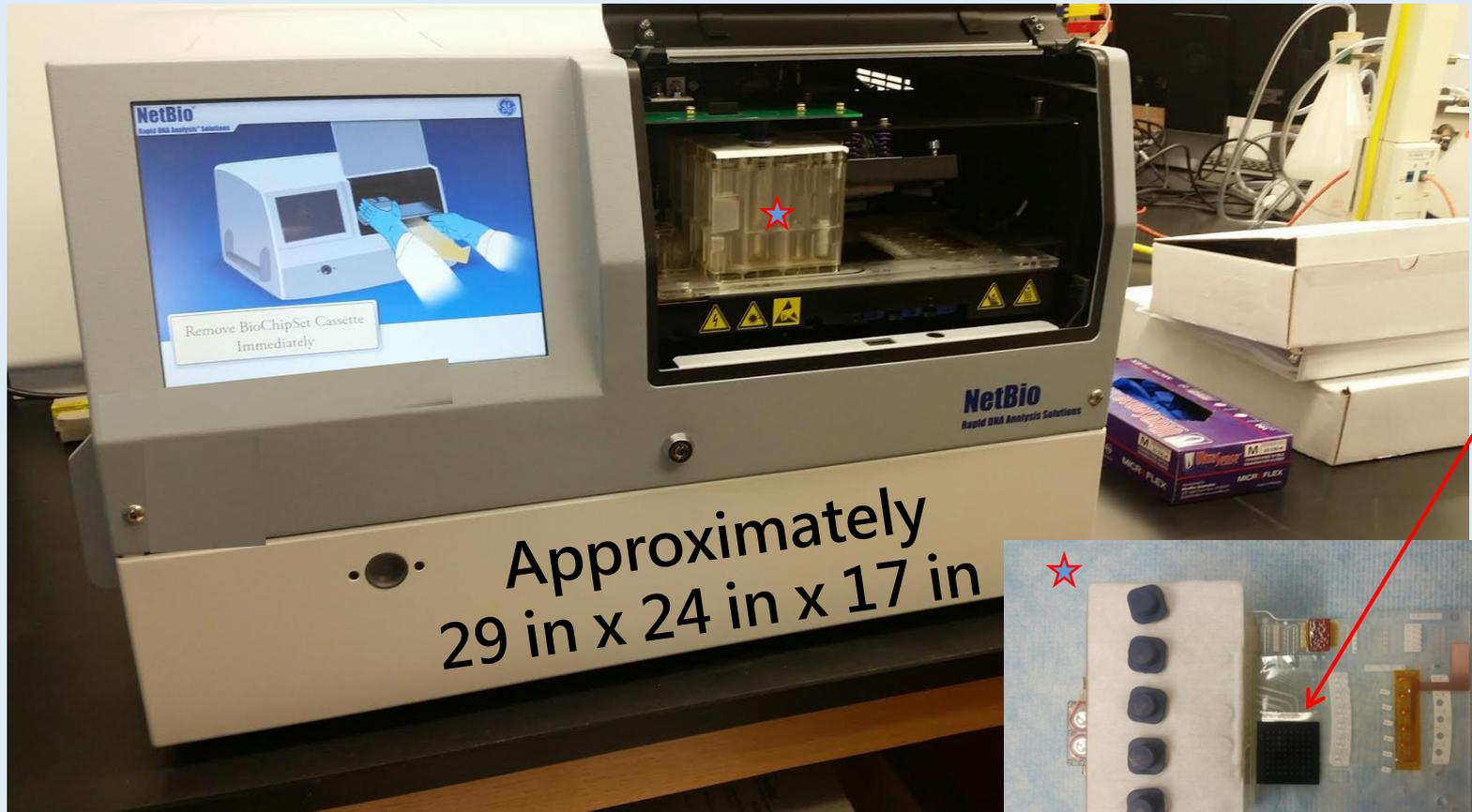
- FlexPlex Assay
- Controls
 - None included on the Chip
- Ladders
 - A ladder is run with each Chip
 - Note: If the ladder run with the Chip does not pass a preinstalled ladder is used
- Size Standard
 - Internal lane standard is reviewed by the instrument

Instrument Use

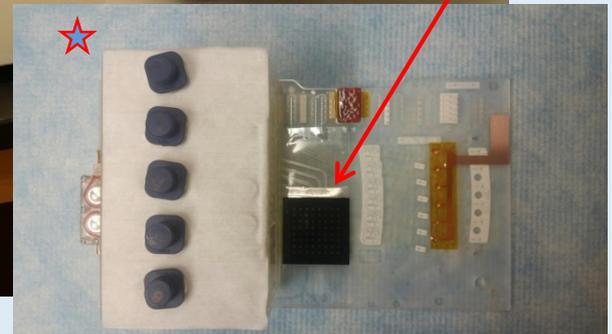
- Approximately 20 minute instrument start-up
- Secure login -3 security options available
- Enter sample information
- Scan RFID tag for each swab
- Place Chip in instrument
- Approximately 92 minute run time



Run Completed

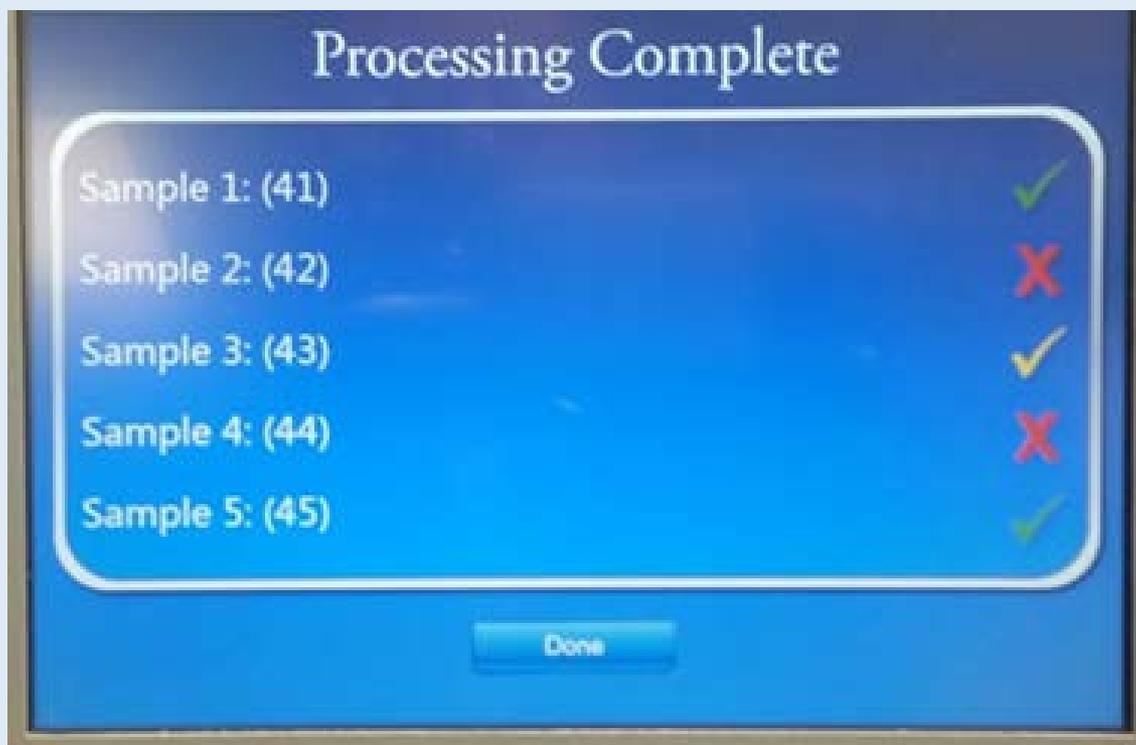


Approximately
29 in x 24 in x 17 in



12 in x 6.5 in x 4.5 in

View and Export A-Chip Data



 Sample passed – All 20 CODIS core loci

 Sample failed - < 20 CODIS core loci

 Sample flagged yellow – OLA at a CODIS core loci not in allele table

Data RESULTS

Possible Reason for failure	ANDE™ Rapid Instrument Results	CBI – Forensic Services Results
Tri-allele	Sample Fails	After verification sample is uploaded to CODIS
Low peak height	Sample Fails	Sample is re-run using additional methods
OLA	Sample passes if in the allele table	After verification sample is uploaded to CODIS
Peak Height Imbalance	Sample Fails	After verification sample is uploaded to CODIS
ILS	Sample Fails	Sample will be re-run
Peak between loci	Sample Fails	After verification sample is uploaded to CODIS

Data from CBI-FS

- Tri-alleles comprise less than 1% of our samples in CODIS.
 - Using current technology samples with a tri-allele will not pass on a Rapid Instrument.
- A 1st time pass rate of approximately 93% was determined using data from 2013.
 - Problem samples can be run again using additional methods.
 - All genetic anomalies must be run twice.

Key Data Points

- All samples were concordant
- One Chip failed due to a software error
- One of the samples run had an OLA that was called correctly (NIST-STRBase table)
- Four samples failed
 - 3 low peak heights – possibly due to collection
 - 1 overall low sample with all alleles called
- Data obtained from Rapid Instrument not analyzed in GMID-X (including ladders)

Instrument Pass Rate For Rapid Instruments

2017

92%



Percentage does not include the failed run

2015

80%



Four samples that were flagged yellow had less than 13 loci

Advantages

- Easy to use
- Compact and light weight
- Low maintenance
- Easy to transfer data
- Cap design on swab (square design)
- Simple results
- Tracks sample based on RFID tag even if placement is incorrect on Chip

Disadvantages

- Cost
- Chip
 - Excessive Packaging
 - Must be used within 15 to 30 minutes of opening
 - Temperature/handling
- No distinguishable notification that run is complete
- Limited to 5 samples per run
- Loud
- RFID Swabs
 - Long term storage not advised
 - Limited to only a single collection device (swabs only)

Comparison Table

2015	2017
PowerPlex (16 loci)	FlexPlex (27 loci)
No barcode scanner	Barcode scanner option
No desiccant in swab cap	Desiccant included in swab cap
1 Chip option	2 Chip options
Self tape for seal on used chip	Sticker provided for seal on used chip
88 minute run time	92 minute run time
Set warm-up time	Self adjusting warm-up time
Chips near expiration may fail (hand made)	Adjusted expiration date to increase shelf life (automated production)
Several step decryption process for viewing data on a computer	One step decryption process for viewing data in FAIRS software
1 un-scanned RFID tag on swab allowed	No un-scanned RFID tag on swab allowed

Overall Opinion

- Positive improvements
- Only negative is the 1 RFID scan mismatch change
- Did not observe any dropout this time
- No yellow flags
- Kit includes more loci

Legal hurdles for Colorado

16-23-104. Collection and testing

- (1) The Colorado bureau of investigation shall provide all specimen vials, mailing tubes, labels, and other materials and instructions necessary for the collection of biological substance samples required pursuant to this article.
- (2) The Colorado bureau of investigation shall chemically test the biological substance samples collected pursuant to this article. The Colorado bureau of investigation shall file and maintain the testing results in the state index system after receiving confirmation from the arresting or charging agency that the adult was charged with a felony. If the Colorado bureau of investigation does not receive confirmation of a felony charge within a year after receiving the sample for testing, the Colorado bureau of investigation shall destroy the biological sample and any results from the testing of the sample. The Colorado bureau of investigation shall furnish the results to a law enforcement agency upon request. The Colorado bureau of investigation shall store and preserve all biological substance samples obtained pursuant to this article.



Thank you to the CBI Database staff for their participation as well as to ANDE™ for allowing us to test their instrument and providing consumables!

