

# ***Freedom EVO<sup>®</sup> - HSM Workstation***

***For Large Volume gDNA Purification***

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# Freedom EVO - HSM workstation for gDNA Extraction



- **High quality DNA**
  - Excellent purity
  - Linear yields
  - High molecular weight DNA
- **Scalable**
  - Sample volume (1ml - 10ml)
  - Sample number (1- 32)
- **Efficient workstation design**
  - Compact workstation (120 cm)
  - Samples processed in single 50ml tube
- **Touch screen based user interface**



# Freedom EVO - HSM workstation

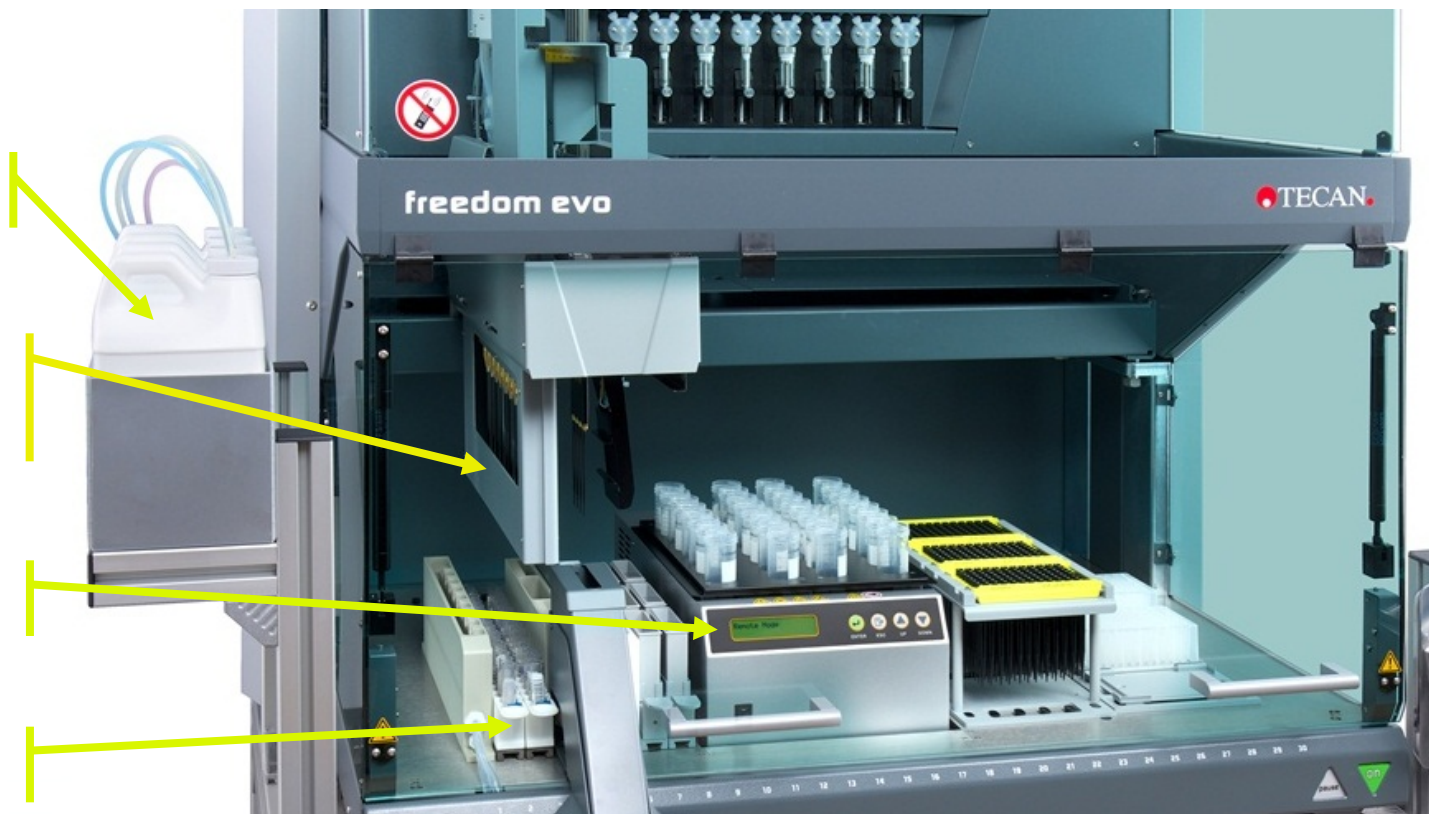


Bulk reagent dispensing

Bulk waste vacuum aspiration

Promega HSM

Sample tubes



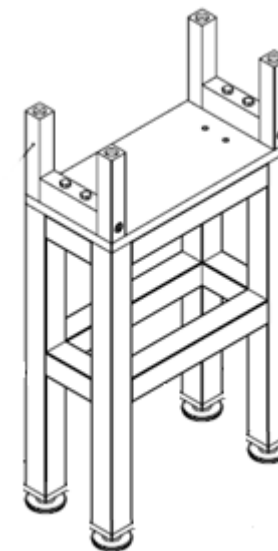
# HSM unit = Heater Shaker Magnet

One-tube-reaction - tube stays in HSM unit during whole process

- reduced risk of cross-contamination
- Highly reduced plastic waste
- Barcoding optional



HSM unit is isolated from Freedom EVO and stands on its own frame, because of vigorous shaking

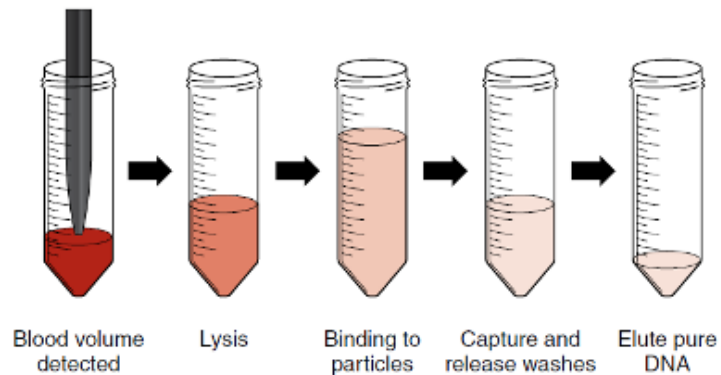


# Scalability



## Optimized extraction from 1-10ml

- Allows for all input volumes at the same time
- Protocol self adjusts optimal reagent volumes for each sample
- Only one kit for entire sample range
- All volumes at same time



# Efficient liquid handling



Clean dispensing of small volumes

- 4 channels for disposable tips on LiHa
- DiTi are used for dispensing of volumes up to 1ml



# Efficient liquid handling



## 4 bulk reagents

- Cell lysis buffer, binding buffer, wash buffer and ethanol
- Dispensing of up to 12ml through 4 wide bore tips

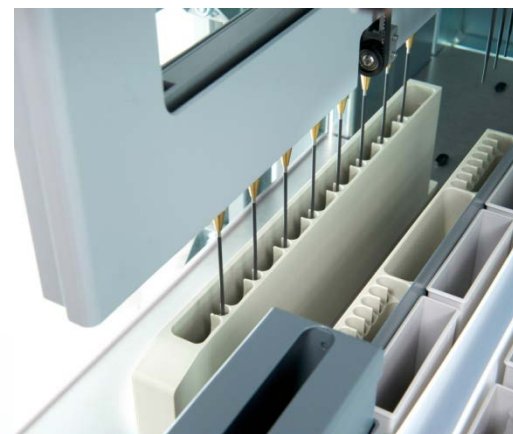
Bulk reagents are located on a side shelf and connected to the LiHa via a 6-way-valve

- Fast dispensing of buffers



# *Efficient liquid handling*

- Dedicated vacuum system for fast removal of liquid waste**
- Features of vacuum system**
  - **8 vacuum channels are mounted onto the LiHa**
  - **Vacuum channels have separate waste tubing to ensure purity**
  - **Each vacuum channels is regulated by an independent valve for careful waste removal**
  - **Active wash station for vacuum channels to minimize cross-contamination**

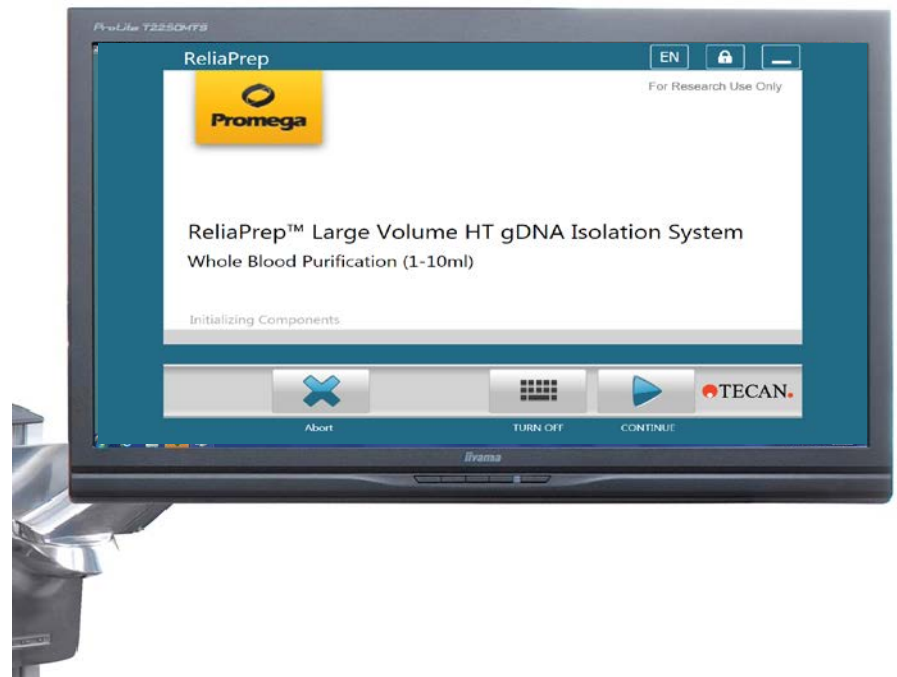




# *Touch screen based system*



- Pre-installed protocols
- Interactive touch screen
- Easy guided set-up



# Selection of primary and elution tubes



PARAMETERS Set parameters (1 global, 0 iteration-specific) EN

Main Window

Number of Samples 0

Elution Volume 1000 ul

RNase Treatment  Concentrated TE Addition

Sample Input Options

- 50ml conical tubes on HSM
- Small Primary Tubes
- Large Primary Tubes

Elution Labware

- Elute into Tubes
- Elute into a Plate
- Leave in Intermediate Plate

Barcode Options

- Do Not Use Barcodes
- Import List of Sample Barcodes at Runtime
- Manually Enter Barcodes for each Sample

ReliaPrep Large Volume: Blood

Promega

CANCEL CONTINUE

TECAN

Sample # input

Selection of elution volume

Selection of starting tubes and elution tubes or plate

# Simple deck set up with step by step user prompts



PARAMETERS Set parameters (1 global, 0 iteration-specific) EN

Grid 18: Tip Rack Carrier containing 1000ul conductive tips with filter. A minimum of 1.5 tip boxes should be present

Main Window

Deck Setup

Vacuum Manifold Wash Station  
Sample Tubes  
Sample Tubes  
Vacuum Manifold NaOH Trough  
Alk Pro  
Resin  
Pro K  
NFY  
RNase  
Conc E  
HSM

1ml Tips  
1ml Tips  
1ml Tips

Intermediate Plate  
Elution Plate

Grid 5 10 15 20 25 30

Touch a Deck Position to View Setup Instructions

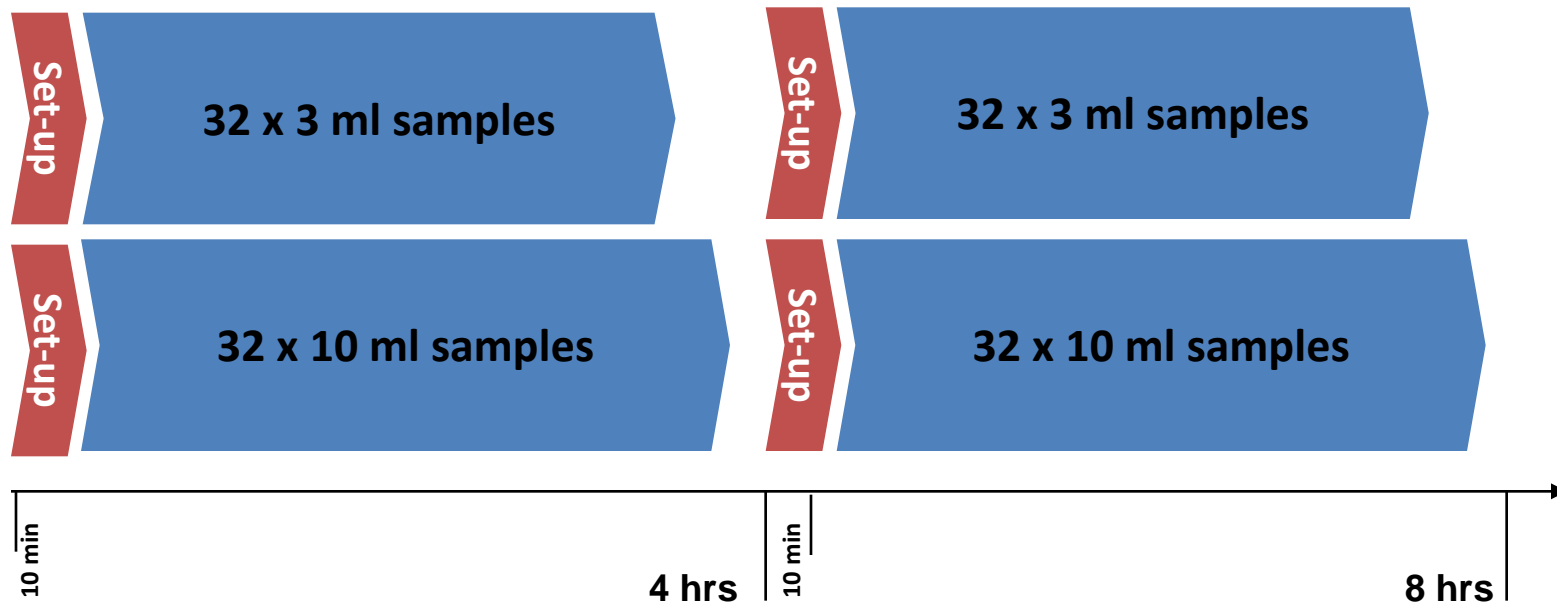
ReliaPrep Large Volume: Blood

Promega

CANCEL CONTINUE

1. Primary samples
2. Disposable Tips
3. Small volume reagents

# Throughput



These times do not include transfer from primary sample tubes

# DNA Purification kit



## □ ReliaPrep™ Large Volume HT gDNA Isolation System

- Unique magnetic cellulose bead based chemistry
- One kit purifies up to 96 samples of 10 ml or multiples of smaller volume

## □ One kit for gDNA isolation from

- Fresh blood (1 – 10 ml)
- Compromised blood (frozen or hemolysed) (1 – 10 ml)
- Buffy coat (0.25 - 1.5 ml)
- Packed Cells, Oragene saliva,...

## □ Using common anticoagulants (EDTA, heparin, citrate)

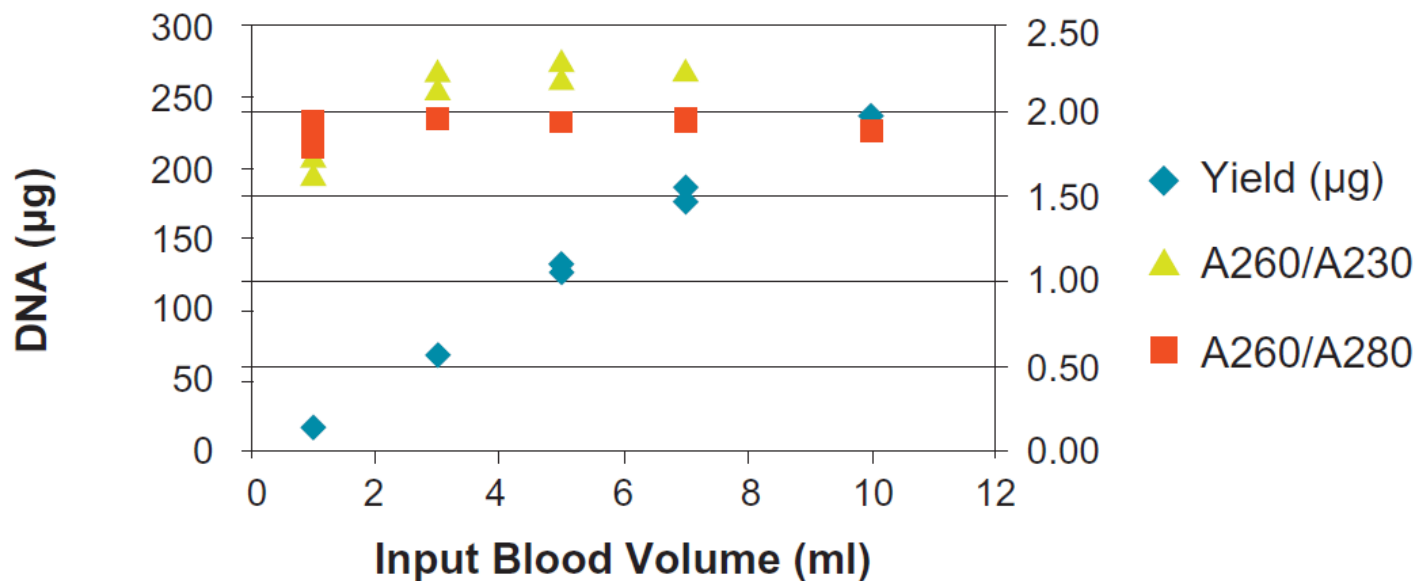


# Performance



□ High purity independent of sample volume

### Yield and Purity from 1-10ml blood



# Performance

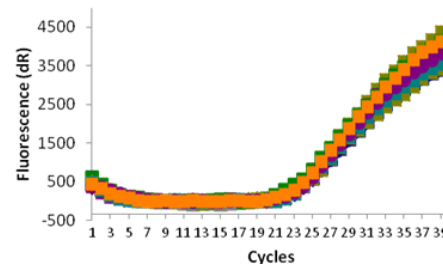


High purity = no observed cross-contamination

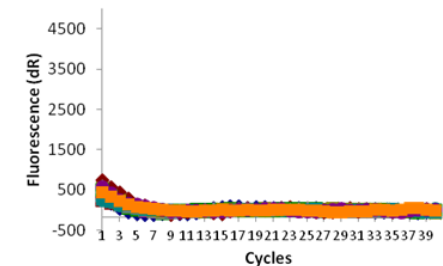
- Male and female blood samples were arranged in a checkerboard pattern and purified with the Freedom EVO<sup>®</sup> - HSM workstation
- No male specific gDNA was detected in the female samples.

	1	2	3	4
A	152	No C <sub>T</sub>	175	No C <sub>T</sub>
B	No C <sub>T</sub>	>250	No C <sub>T</sub>	>250
C	>250	No C <sub>T</sub>	>250	No C <sub>T</sub>
D	No C <sub>T</sub>	>250	No C <sub>T</sub>	244
E	119	No C <sub>T</sub>	235	No C <sub>T</sub>
F	No C <sub>T</sub>	>250	No C <sub>T</sub>	208
G	165	No C <sub>T</sub>	191	No C <sub>T</sub>
H	No C <sub>T</sub>	185	No C <sub>T</sub>	>250

Amplification Plots  
Male samples



Amplification Plots  
Female samples



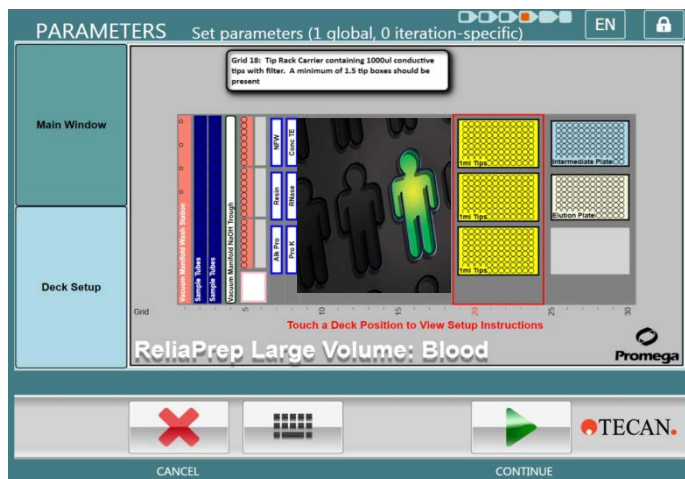
# Biologically Relevant Workstation: Biological Acceptance Testing



Promega made  
**Biologically Relevant**  
*Cell-Based Assays* the Gold Standard in  
High-Throughput Screening

Promega now introduces  
**Biologically Relevant**  
*Workstation manufacture and installation assays*  
for High-Throughput DNA Extraction.

Biological Acceptance Testing: a new Gold  
Standard of integrated off-the shelf automation  
design and placement.





# Freedom EVO – HSM workstation: Bsp. BAT-Results

Freedom Evo HSM Test Blood  
(Promega/Tecan)

06.06.2013 / ZeBanC / Berlin

K-EDTA Whole Blood (Standard BAT blood from Promega)

Elution 1000µl ddH2O

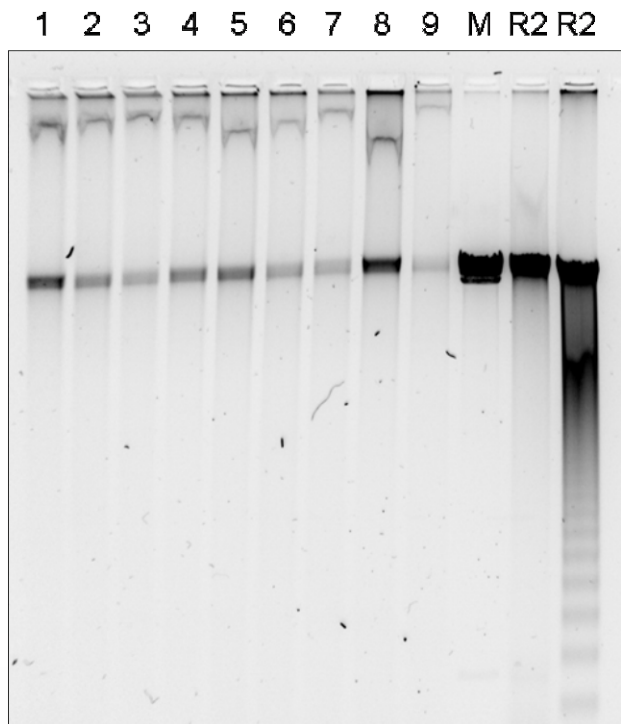
## Nanodrop Results

Sample ID	Initial Volume Blood	ng/µl	A260/280	A260/230
1	3ml	57,3	1,96	2,13
2	3ml	50,9	1,98	2,12
3	3ml	52,3	1,95	1,98
4	3ml	49	1,96	1,96
5	3ml	57	1,94	2,09
6	3ml	46,2	1,95	2,02
7	3ml	43,6	1,94	1,97
8	3ml	71,5	1,93	2,09
9	1.5ml	31,8	1,97	1,96
Blank		-0,3	0,29	-1,18
Blank Plate		3,8	1,55	0,75

# Freedom EVO – HSM workstation: Bsp. BAT-Results

## Gel Electrophoresis (2013-06-07)

0.8%, 1:80000 Gelred Staining, 80-100V, ~2h running, 1 $\mu$ l DNA sample/lane,  
Control DNA Ref. 1 (R1 86ng/ $\mu$ l) & 2 (R2 270ng/ $\mu$ l), M Marker GeneRuler High Range 0,06  $\mu$ g  
Ref. DNA = Qiagen DNA Blood Kits

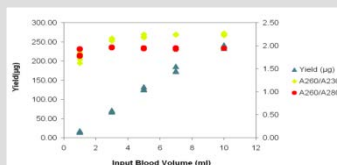


# Freedom EVO - HSM workstation: summary

Scalable



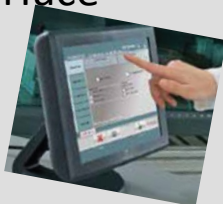
Performance



Compact



Touch interface



Efficient



Biologically Relevant

BAT

