A Novel Automated Method to Purify DNA and RNA from Viruses: The Maxwell® 16 Viral Total Nucleic Acid Purification System

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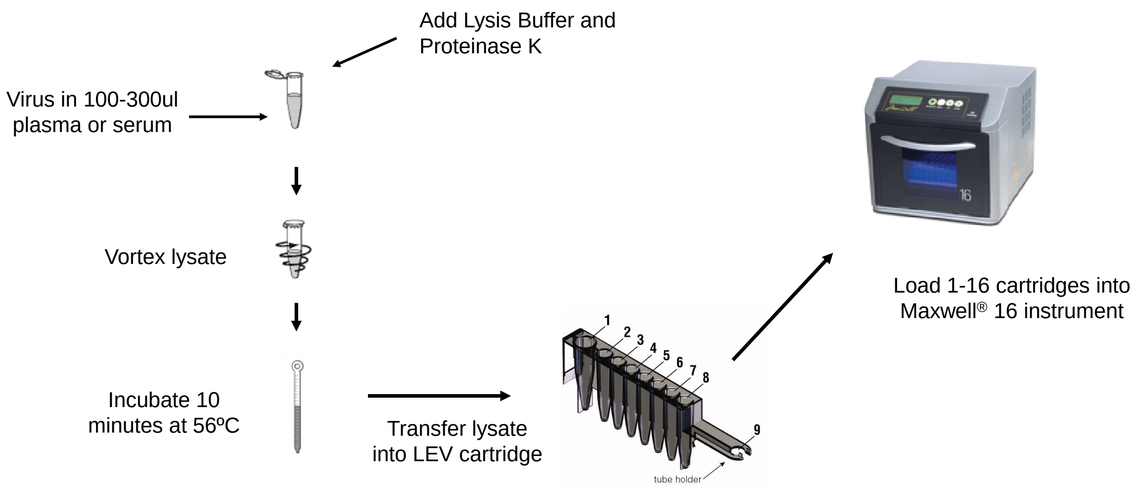
Introduction

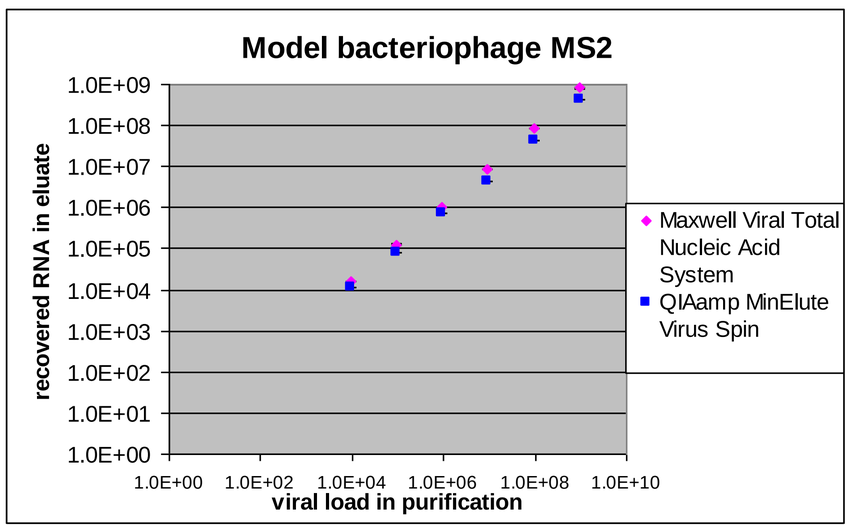
The Maxwell® 16 Viral Total Nucleic Acid Purification System purifies both RNA and DNA virus targets from plasma or serum:

- Sample size 100-300ul
- Minimal preprocessing
- Low Elution Volume (LEV) format with 50ul elution
- Compatible with qPCR and qRT-PCR downstream assays
- Verified with virus models and clinical targets
  - Model RNA : MS2 bacteriophage
  - Model DNA: Lambda bacteriophage
  - Clinical RNA: Hepatitis C Virus
  - Clinical DNA: Hepatitis B Virus and Cytomegalovirus

Protocol



RNA Virus purified across 5 log range of concentrations



n=3

Hepatitis C Virus Purification

Inactivated Hepatitis C Virus (HCV, ZeptoMetrix) in human serum was purified with the Maxwell® Viral Purification system or the manual QIAamp MinElute Virus Spin kit. Purified virus eluates were frozen then submitted to the UW Hospital Medical Laboratories for quantitation with a validated qRT-PCR assay

	MEAN	%CV	Expected
Maxwell	143,259 IU/ml	5.4	50,000 IU/ml
QIAamp	84,622 IU/ml	27	50,000 IU/ml

3 Maxwell samples of 300 ul serum, and one 200 ul serum. 3 Qiagen samples of 200 ul serum. Results normalized to IU/ml plasma (Note: The amount of virus in a sample can vary 3-5 fold from the IU/ml value leading to the difference between calculated and expected IU/ml values)

Reproducibility

Model Bacteriophage Lambda DNA

	Low viral load	Medium viral load	High viral load
viral copy number per ml plasma:	1.00E+06	2.50E+07	5.00E+08
CV% within run (n=6)	16%	11%	11%
	13%	11%	22%
	11%	13%	20%
CV% between 3 runs (n=18)	14%	11%	18%
QIAamp CV% (n=6)	16%	29%	29%

Benefits and Conclusions

The Maxwell® 16 Viral Total Nucleic Acid Purification System efficiently purifies viral RNA and DNA from plasma or serum for use in downstream applications such as real-time PCR

Detection limits are dependent on virus type and species as well as the sensitivity of the downstream assay.

Recovery is comparable to *Qiagen's QIAamp MinElute Virus spin column-based method.

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