# Viral DNA Isolation Kit


**Research, Development & production of**

**Advanced Medical Diagnosis**

**2022**

# Viral DNA Isolation Kit

# Hand Book

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**Designed for the isolation of Viral DNA from Serum, Plasma, Blood, Buffy coat, Tissues and Cell lines.**

## Kit contents

| Solution | Description | Storage | 50 preps | 100 preps |
|---|---|---|---|---|
| **ATL** | Tissue lysis Buffer | +16 to 25°C | 10 ml | 20 ml |
| **ADLB** | Lysis Buffer | +16 to 25°C | 12.5 ml | 25 ml |
| **AW1 (Ready to use)** | Inhibitor Removal Buffer | +16 to 25°C | 25 ml | 50 ml |
| **AW2 (Ready to use)** | Washing Buffer 2 | +16 to 25°C | 30 ml | 60 ml |
| **ABB** | Binding Buffer | +16 to 25°C | 9 ml | 18 ml |
| **Proteinase K** | Sample lysis and inactivation of DNase | -20°C | 1.25 ml | 2.5 ml |
| **G solution** | DNA Binding | -20°C | 500 µl | 1 ml |
| **ADEB** | Elution Buffer | +16 to 25°C | 2.5 ml | 5 ml |
| **Spin column** | High pure silica membrane | | 50 pcs | 100 pcs |
| **Collection tube** | | | 150 preps | 300 preps |

## Storage Condition and Stability

1- All solutions of ABG Viral DNA Isolation Kit are clear and should be stored at Room Temperature (RT: +16 to +25°C).

*! The buffers can show a slight yellow color. This will have no impact on the function of the buffer.*

2- When precipitates have formed in solutions, warm the solutions in 56°C water bath until the precipitate dissolve.

3- Store Proteinase K and G solution at -20°C. Repeated freezing and thawing Should be avoided.

4- All kit components are stable until the expiration date on the kit box, without showing any reduction in performance.

5- Improper storage at +2 to 8°C or -20°C will adversely impact nucleic acid purification because solutions might be precipitated.

## Additional Equipment (not provided)

1- 1.5- or 2.0-mL micro-centrifuge tubes

2- Pipettes and filter tips (RNase free)

3- Standard tabletop microcentrifuge capable of 17,000 xg centrifugal force

4- Vortex mixer

5- Heat Block

6- Personal protection equipment (lab coat, gloves, goggles)

## For the isolation of nucleic acids from formalin-fixed paraffin-embedded tissue sections

- Xylene
- Ethanol, 100%, 80%, 50%

## For the isolation of nucleic acids from cell lines, whole blood, buffy coat or cultured cells

- PBS

## Product description

ABG Viral DNA Isolation Kit is designed for rapidly and easily isolation of Viral DNA from a variety of sample sources including whole blood, buffy coat, serum, plasma, cultured cells, tissue samples.

This kit employs a proprietary lysis buffer in combination with spin column membrane to efficiently purify DNA from biological sample. The protocol provides a simple method to achieve rapid isolation of highly purified DNA. Isolated DNA has high quality metrics, including A260/A280 > 1.8 and A260/A230 > 2.0 and minimal residual RNA. DNA prepared by this kit is suitable for a variety of downstream applications.

## Sample Materials:

**200 to 300 µl mammalian whole blood (EDTA)**

**200 µl buffy coat**

**Serum**

**Plasma**

**Body fluid**

**25 to 50 mg mammalian tissue**

**Formalin-fixed paraffin embedded tissue**

## Quality Control

All components of ABG Viral DNA Isolation Kit are manufactured in strictly clean conditions, and their degree of cleanliness is monitored periodically. To maintain consistency, a quality control process has been carried out thoroughly from lot to lot and only the approved qualified kit will be delivered. For quality control purpose, the DNA is isolated from cell lines and 250 µl of plasma previously by the manufacturer. Viral load is measured by quantitative Real time PCR

## Warning and precautions

1- Wear disposable gloves, laboratory coats and eye protection when handling specimens as if potentially infectious and reagents.
2- Wash hand thoroughly after handling samples and reagents.

3- Use sterile, disposable plastic wares and filtered pipette tips.
4- Buffers of the kit contain irritants which are harmful when contact with skin and eyes, or when inhaled and swallowed. Avoid to contacting the lysis buffer and wash buffers with acidic solution and bleach.
5- Workflow in the laboratory must proceed in a uni-directional manner, beginning in the Extraction Area and moving to the Amplification and Detection Areas. Do not return samples, equipment and reagents in the area where you performed in previous steps.
6- Safety Data Sheets (SDS) are available online.

## Before to begin

1. All centrifugation steps are carried out at room temperature (15 to 25°C).
2. Sample should be equilibrated to room temperature.
3. Check all reagent for any precipitation. If Lysis Buffer forms precipitate, please warm the it in a 56°C water bath until the precipitates dissolve.
4. Use fresh material to avoid degradation of DNA.
5. Preheat thermo block or water bath to 70°C before starting the procedure.
6. Pre-fill the needed amount of ADEB into a sterile 2.0 ml reaction tube and incubate the ADEB at 75°C until the final step.

## Storage of samples

| Sample type | Short term storage | Long-term storage |
|---|---|---|
| **Whole blood (EDTA)** | 48 hours (+2 to +8°C) | -70°C |
| **Serum** | 48 hours (+2 to +8°C) | -70°C |
| **Plasma** | 48 hours (+2 to +8°C) | -70°C |
| **Body fluids** | 48 hours (+2 to +8°C) | -70°C |
| **Cell lines** | 48 hours (+2 to +8°C) | -70°C |
| **Tissue** | 2 weeks (+16 to +25°C) | -70°C |
| **Tissues in VTM/ PBS/ Saline** | 48 hours (+2 to +8°C) | -70°C |
| **formalin-fixed paraffin- embedded** | (+16 to +25°C) | (+16 to +25°C) |

## Procedure:

### ➢ Sample preparation:

#### ❖ Blood

1- If the sample volume is <250 µl, add the appropriate volume of sterile PBS.

2- If the sample volume is between 250 µl and 300 µl, increase all other sample volumes accordingly.

3- If RNA- free genomic DNA is required, add 4µl of 100mg/ml RNase A solution (optional).

#### ❖ Cultured cells, papilloma specimens (thin prep, oral cells, urine), cell lines, ...

1- Transfer up to 1-3 ml of specimens to a centrifuge tube.

2- Centrifuge for 5 min at 10,000 xg, discard the supernatant.

***! For Isolation from poor cell samples, store 250 µl of supernatant together with the pellet and proceed to protocol for DNA isolation.***

3- Resuspend the cell pellet in 250 µl PBS.

4- Proceed to protocol for DNA isolation.

#### ❖ Formalin-fixed paraffin-embedded samples

**Deparaffinization**

1- Add 1 ml xylene to five, 20 µm thick section tissue.

2- Mix well by vortex and incubate for 5-15 minutes (depends on the thickness of the section).

3- Centrifuge for 3 minutes at 10,000 xg, and discard the supernatant.

*! Repeat this step depends on the thickness of the section.*

## Dehydration

| | |
|---|---|
| 4- Add 1 ml Ethanol respectively:<br>! *After resuspending pellet in ethanol (100%,80%,50%), mix well by vortex, then centrifuge for 3 minutes at 10,000 xg, and discard supernatant*. | a. Ethanol 100% |
| | b. Ethanol 80% |
| | c. Ethanol 50% |

! *The section should turn to white color after it is adding the ethanol.*

## Rehydration

5- Add 1 ml double-distilled water (DDW), mix well by vortex for 10 seconds.

6- Centrifuge for 3 minutes at 10,000 xg, and discard supernatant.

7- Incubate the tube for 20 minutes at 40°C.

## Tissue lysis step

| | |
|---|---|
| 8- To a nuclease free 1.5 ml microcentrifuge tube add: | a. Deparaffinized tissue |
| | b. 200 µl ATL. |
| | c. 25 µl P.K. |

9- Mix immediately by pulse-vortex (20 seconds) and incubate at 56°C for 1 hour.

*! During the incubation, vortex the sample every 10 minutes.*

*! After this incubation, no tissue particles should be visible (depends on the thickness of tissue).*

! If the tissue digested incompletely, add additional 20 µl P.K and incubate until the digestion is completed.

10- Incubate for 1 hour at 90°C.

11- Proceed to protocol for DNA isolation.

## ❖ Tissue (stored at VTM/ PBS/ Saline)

### Tissue lysis step

| | |
|---|---|
| 1- To a nuclease free 1.5 ml microcentrifuge tube add: | a. Tissue (25- 50 mg) |
| | b. 200 µl ATL. |
| | c. 25 µl P.K. |

2- Mix immediately by pulse-vortex (20 seconds) and incubate at 56°C for 1 hours.

*! During the incubation, vortex the sample every 10 minutes.*

*! After this incubation, no tissue particles should be visible (depends on the thickness of tissue).*

*!* If the tissue digested incompletely, add additional 20 µl P.K and incubate until the digestion is completed.

3- Proceed to protocol for DNA isolation.

## ❖ Protocol for DNA Isolation

### Before to begin

1- Set a heating block to 70°C.

2- Pre-fill the needed amount of ADEB into a sterile microcentrifuge tube and incubate the ADEB at 75°C until the elution step.

3- Always mix the Proteinase K briefly before use.

### DNA Lysing Step

| | |
|---|---|
| 1- To a nuclease free 1.5 ml microcentrifuge tube add:<br>*(! Do not add Proteinase K directly to Binding buffer)* | a. 250 µl sample |
| | b. 250 µl ADLB |
| | c. 25 µl P. K |
| | d. 10 µl G solution |

2- Mix immediately by pulse-vortex (20 seconds) and incubate at 70°C for 10 minutes.

***! During incubation, vortex the sample every 3-5 minutes.***

### Binding Step

3- Add 175 µl of ABB and mix well by pulse-vortex (20seconds).

***! In the presence of undigested or precipitated remnants centrifuge at 10,000 rpm is recommended. Use supernatant for next step.***

4- Assemble one spin column in to one collection tube.

5- Pipette the liquid sample in to the upper reservoir of the spin column.

6- Centrifuge for 30 seconds at 12,000 rpm.

7- Remove the spin column from the collection tube and discard the flow through liquid, and the collection tube.

8- Assemble the spin column with a new collection tube.

## Washing Steps

9- Add 500 µl AW1 to the upper reservoir of the spin column.

10- Centrifuge for 30 seconds at 12,000 rpm.

11- Remove the spin column from the collection tube and discard the flow through liquid, and the collection tube.

12- Assemble the spin column with a new collection tube.

13- Add 600 µl AW2 to the upper reservoir of the spin column.

14- Centrifuge for 30 seconds at 12,000 rpm and discard the flow through.

15- Add 200 µl AW2 to the upper reservoir of the spin column.

16- Centrifuge for 1 minute at 12,000 rpm and discard the flow through.

17- Centrifuge for 3 minutes at 14,000 rpm to remove residual ethanol.

18- Remove the spin column from the collection tube and discard the collection tube.

## Elution Step

19- Insert the spin column into a clean, sterile 1.5 ml microcentrifuge tube.

20- Add 50 µl of prewarmed ADEB to the upper reservoir of the spin column and incubate at RT (+16 to +25°C) for 2 minutes.

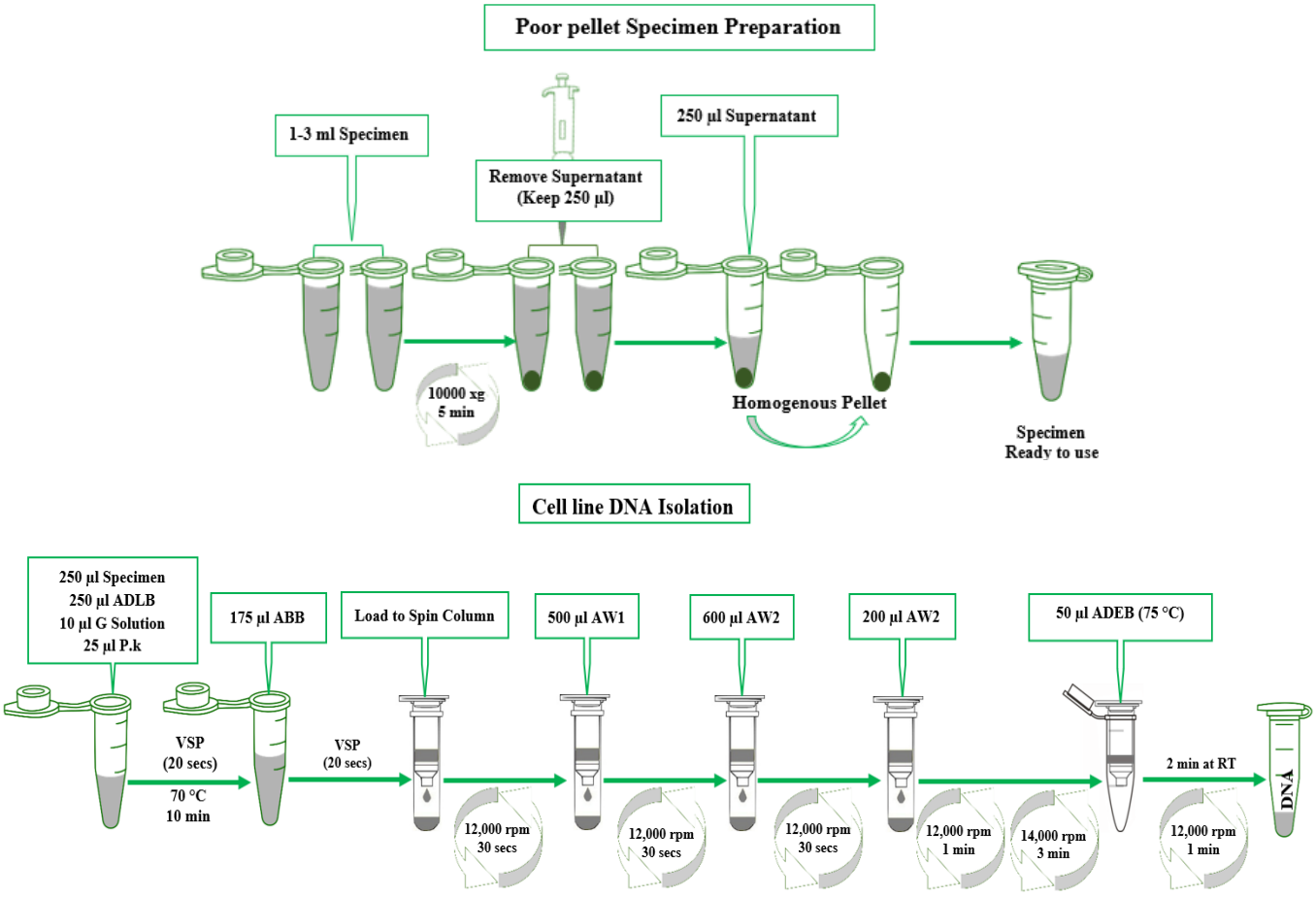
21- Centrifuge for 1 minute at 12,000 rpm.

22- Use the eluted DNA directly or store it at -20°C for short term use.

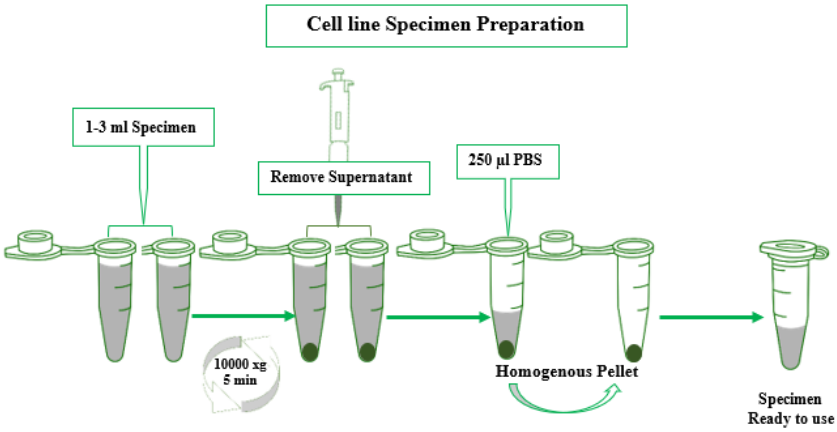
23- For later analysis store eluted DNA at -70°C.

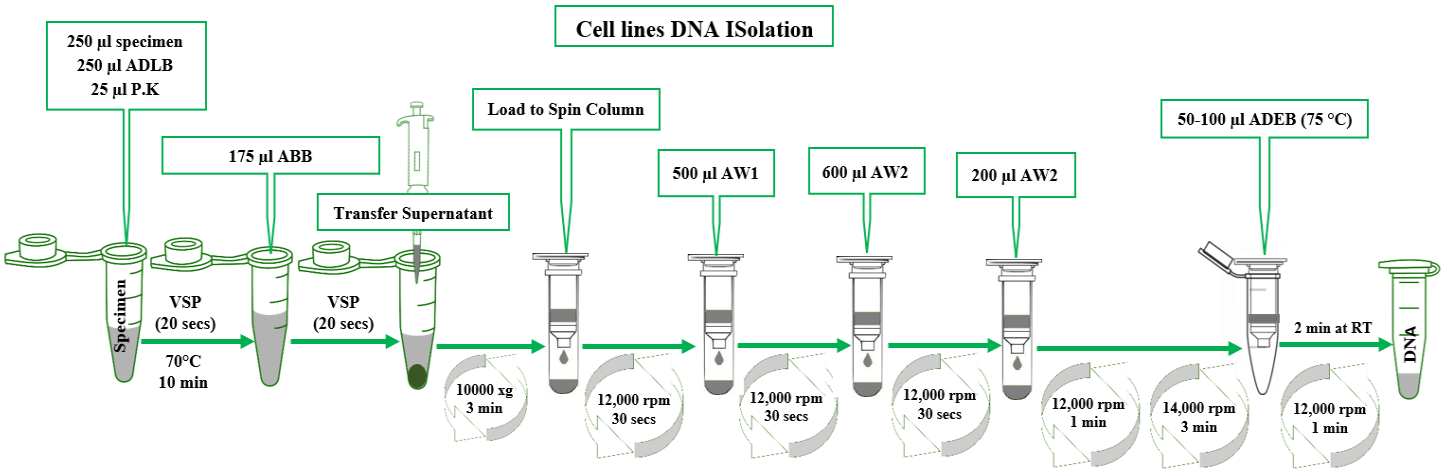
## Viral DNA Isolation charts:

### Cell lines: Poor pellet Isolation (Amniotic fluid, Urine, thin prep, oral swab, …)

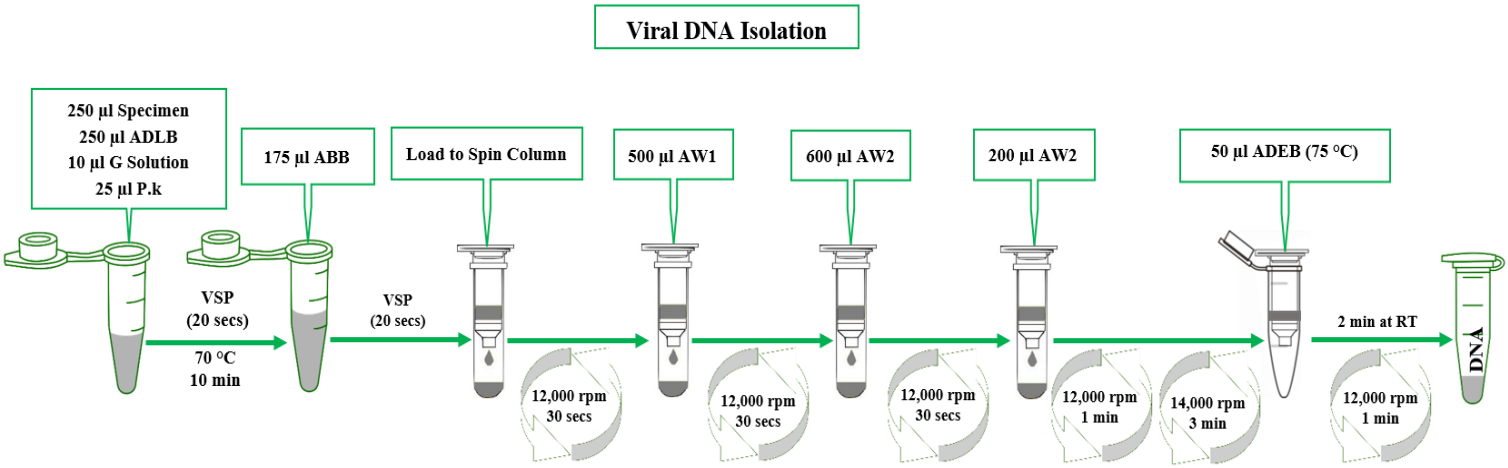



### Cell lines: thin prep, cell culture, oral swabs, …

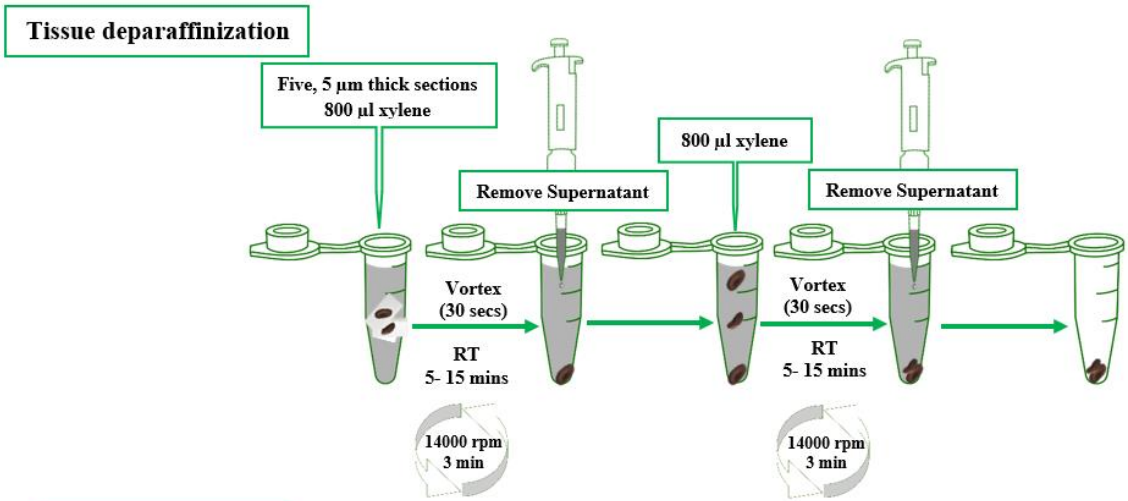


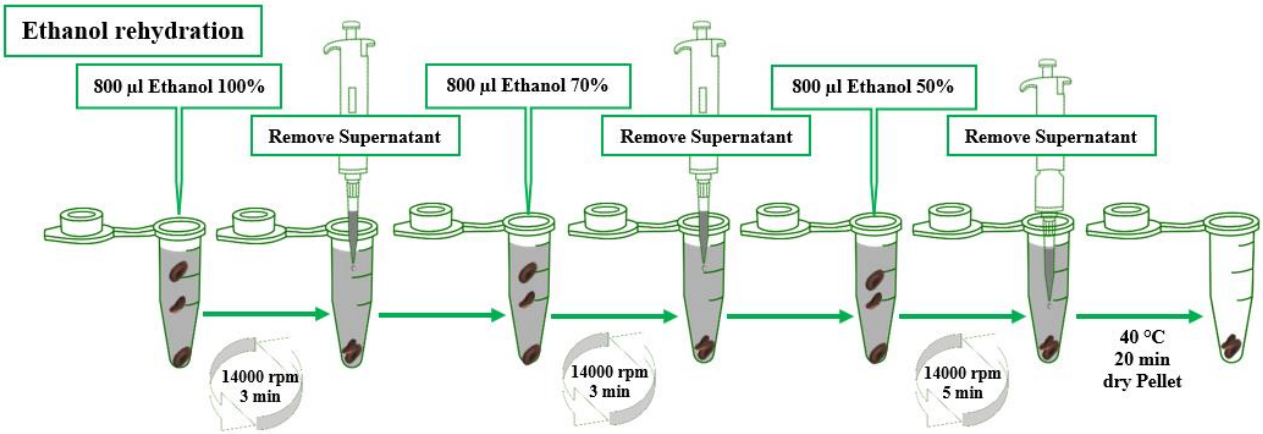


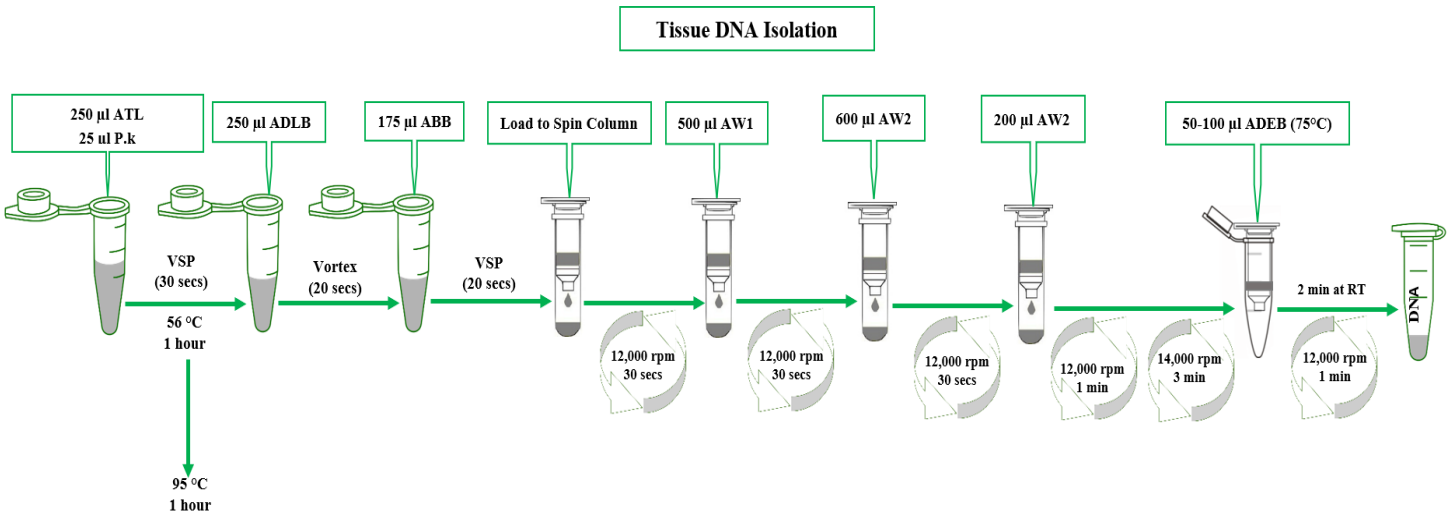

## Viral DNA Isolation (serum, plasma, body fluids,…)



## Tissue DNA Isolation:



## Troubleshooting

This troubleshooting guide may be helpful for solving any problems that may arise. However, if you have questions or experience problems with this product. Please contact our Technical Support staff. Our scientists are committed to provide rapid and effective assistance.

| Observation | Cause | Comment |
|---|---|---|
| **low nucleic acid concentration** | Kit stored under suboptimal conditions | Store kit contents according to the labeled temperature |
| | Buffers or other reagents were exposed to conditions that reduced their effectiveness | Store all buffers at +16 to +25 ℃ |
| | | Close all reagents bottles tightly, to preserve pH, stability, … |
| | | Aliquot and store P.K, G solution, lysozyme at -20°C |
| | Incomplete cell lysis because of insufficient Proteinase K activity | Repeat the extraction procedure with a new sample. Use a fresh or well stored Proteinase K stock solution. |
| | Incomplete cell lysis because of insufficient mixing with ADLB | Repeat the extraction procedure with a new sample. Mix the sample and ADLB immediately and thoroughly by pulse-vortex (Recommended 45 seconds). |
| | Incomplete lysis because of insufficient incubation time | Repeat the extraction procedure with a new sample. Extend the incubation time and make sure that no residual particulates remain. |
| | Clogged spin Filter (Inefficient disruption or homogenization) | • Increase lysis time<br>• Increase centrifugation<br>Reducing amount of starting material |

| | | |
|---|---|---|
| | Reagents and samples not completely mixed | Mix the sample tube completely after addition of each reagent. |
| | Suboptimal reagent has been used for elution. Alkaline pH is required for optimal elution | Do not use water to elute nucleic acids from spin column. |
| | | Use the elution buffer from the kit. |
| | Smaller amounts of sample material used than specified. | Use 5µl G solution as DNA binder. |
| **Incompletely or no restriction enzyme cleavage product.** | Glass fibers which can co-elute with nucleic acid, scatter light | After elution step is finished, remove the spin column, and centrifuge the tube containing eluted sample for 1 minute at maximum speed. Transfer supernatant into a new tube without disturbing the glass fibers at the bottom of original tube |
| **Absorbency ($A_{260}$) reading of product is too high.** | Glass fibers which can co-elute with nucleic acid, scatter light | See suggestion under "Incompletely or no restriction enzyme cleavage product." above. |
| **Low A260/280** | Eluate containing the purified DNA product is contaminated with ethanol from wash buffers. | After the last wash step, make certain flow through solution containing wash buffer does not contact the bottom of the high pure spin column.<br>If this step has occurred, empty the collection tube and reinsert the contaminated filter, and re-centrifuge for 2 minutes. |
| **Purified DNA sample cannot easily be loaded into the well of an agarose gel, but instead "pops out" of the well as it is loaded.** | Eluate containing the purified DNA product is contaminated with ethanol from wash buffers. | See suggestion under "Low A260/280 (section a)" above. |

## Contact and Support

Aramesh Bio Gene appreciates its customers, and strives to make their experience the best it can be. Ask technical questions about all AB Gene products, from product choice, to product use. AB Gene support team composed of highly trained experienced scientists, who are able to troubleshoot most problems you may encounter.

Contact our technical support at any time by selecting one of these ways:

- phone: +9821- 22142231/22142883
- Email: info@abiogene.ir
- Company address: 1st floor, No. 11, Majd street, East Sarv Street, Kaj Square, Sa'adatabad, Tehran, Iran.