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Takara Bio USA, Inc.

Ordering information
1.800.662.2566
ordersUS@takarabio.com

Technical support
1.800.662.2566
techUS@takarabio.com



takarabio.com

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Viral RNA / DNA isolation

User manual

NucleoMag[®] Virus

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Contact MN

Germany and international

MACHEREY-NAGEL GmbH & Co. KG

Neumann-Neander-Str. 6–8 · 52355 Düren · Germany

Tel.: +49 24 21 969-0

Toll-free: 0800 26 16 000 (Germany only)

Fax: +49 24 21 969-199

E-mail: info@mn-net.com

Technical Support Bioanalysis

Tel.: +49 24 21 969-270

E-mail: tech-bio@mn-net.com

USA

MACHEREY-NAGEL Inc.

2850 Emrick Blvd. · Bethlehem, PA 18020 · USA

Tel.: +1 484 821 0984

Toll-free: 888 321 6224 (MACH)

Fax: +1 484 821 1272

E-mail: sales-us@mn-net.com

France

MACHEREY-NAGEL SARL à associé unique

1, rue Gutenberg · 67722 Hoerdt · France

Tel.: +33 388 68 22 68

Fax: +33 388 51 76 88

E-mail: sales-fr@mn-net.com

Switzerland

MACHEREY-NAGEL AG

Hirsackerstr. 7 · 4702 Oensingen · Switzerland

Tel.: +41 62 388 55 00

Fax: +41 62 388 55 05

E-mail: sales-ch@mn-net.com

www.mn-net.com

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1 Components

1.1 Kit contents

NucleoMag® Virus		
REF	1x 96 preps 744800.1	4 x 96 preps 744800.4
NucleoMag® V-Beads	2 x 1.5 mL	12 mL
Lysis Buffer MVL	2 x 13 mL	125 mL
Binding Buffer MV2	75 mL	300 mL
Wash Buffer MV3	75 mL	300 mL
Wash Buffer MV4	75 mL	300 mL
Wash Buffer MV5	60 mL	250 mL
Elution Buffer MV6	13 mL	60 mL
Carrier RNA*	400 µg	4 x 400 µg
Carrier RNA Buffer	500 µL	4 x 500 µL
Proteinase K (lyophilized)*	20 mg	4 x 20 mg
Proteinase Buffer PB	1.8 mL	8 mL
User manual	1	1

* For preparation of working solutions and storage conditions see section 3.

1.2 Material to be supplied by user

Product	REF	Pack of
Separation plate for magnetic beads separation,		
e.g., Square-well Block (96-well block with 2.1 mL square-wells)	740481 740481.24	4 24
Lysis tubes for incubation of samples and lysis,		
e.g., Rack of Tubes Strips (1 set consists of 1 Rack, 12 Strips with 8 tubes (1.2 mL wells) each, and 12 Cap Strips)	740477 740477.24	4 sets 24 sets
Elution plate for collecting purified nucleic acids,		
e.g., Elution Plate U-bottom (96-well 0.3 mL microtiterplate with 300 µL u-bottom wells)	740486.24	24
e.g., Elution Plate Flat-bottom (96-well 0.3 mL microtiterplate with 300 µL flat-bottom wells)	740673	20
For use of kit on KingFisher® Flex instrument:		
KingFisher® Accessory Kit A (Square-well Blocks, Deep-well Tip Combs, Elution Plates for 4 x 96 NucleoMag® Virus preps using KingFisher® Flex platform)	744950	1 set
For use of kit on KingFisher® Duo / Duo Prime instrument:		
KingFisher® Duo Accessory Kit (KingFisher® Deep-well Blocks, KingFisher® Duo 12 Tip Combs, KingFisher® Duo Elution Strips for 8 x 12 NucleoMag® Virus preps using KingFisher® Duo / Duo Prime platform)	744952	1 set

2 Product description

2.1 The basic principle

The **NucleoMag® Virus** kit is designed for the isolation of viral DNA or RNA from cell-free body fluids such as serum or plasma. This kit provides reagents and magnetic beads for isolation of 96 samples from 200 µL serum or plasma. The procedure is based on the reversible adsorption of nucleic acids to paramagnetic beads under appropriate buffer conditions. Sample lysis is achieved by incubation with a new and improved Lysis Buffer MVL containing chaotropic ions supported by Proteinase K digestion. For binding of nucleic acids to the paramagnetic beads, Binding Buffer MV2 and the NucleoMag® V-Beads are added to the lysate. After magnetic separation, the paramagnetic beads are washed to remove contaminants and salts using Wash Buffers MV3 and MV4. Residual ethanol from previous wash steps is removed by a short incubation of the beads in Wash Buffer MV5. Finally, highly pure viral RNA / DNA is eluted with low salt Elution Buffer MV6 or water. Purified viral RNA / DNA can directly be used for downstream applications. The **NucleoMag® Virus** kit can be used either manually or automated on standard liquid handling instruments or automated magnetic separators.

2.2 Kit specifications

NucleoMag® Virus is designed for rapid manual and automated small-scale preparation of viral RNA / DNA from cell-free body fluids such as serum or plasma samples. The kit is designed for use with NucleoMag® SEP magnetic separator plate (see ordering information) or other magnetic separation systems (see section 2.3). Manual time for the preparation of 96 samples is about 120 minutes. The purified RNA / DNA can be used directly as template for RT-PCR, PCR, or any kind of enzymatic reactions.

NucleoMag® Virus allows easy automation on common liquid handling instruments or automated magnetic separators. The actual processing time depends on the configuration of the instrument and the magnetic separation system used. Typically, 96 samples can be purified in less than 120 minutes using the NucleoMag® SEP on the automation platform.

2.3 Magnetic separation systems

For use of **NucleoMag® Virus**, the use of the magnetic separator NucleoMag® SEP is recommended. Separation is carried out in a Square-well Block (see ordering information). The kit can also be used with other common separators.

Magnetic separator	Separation plate or tube
NucleoMag® SEP (MN REF 744900)	Square-well Block (MN REF 740481)
Tecan Te-MagS™	1.5 mL tubes without lid (Sarstedt)

Static magnetic pins

Separators with static magnetic pins, for example, NucleoMag® SEP (for manual use and for use on liquid handling workstations): This type of separator is recommended in combination with a suitable microplate shaker for optimal resuspension of the beads during the washing and elution steps. Alternatively, beads can be resuspended in the buffer by pipetting up and down several times. For fully-automated use on liquid handling workstations, a gripper tool is required, the plate is transferred to the magnetic separator for separation of the beads and transferred to the shaker module for resuspension of the beads.

Movable magnetic systems

Separators with moving magnetic pins: Magnetic pins/rods are moved from one side of the well to the other and vice versa. Beads follow this movement and are thus pulled through the buffer during the wash and elution steps. Separation takes place when the system stops.

Automated separators

Separators with moving magnets: Magnetic beads are transferred into suitable plates or tubes. Beads are resuspended from the rod-covered magnets. Following binding, washing or elution beads are collected again with the rod-covered magnets and transferred to the next plate or tube.

2.4 Adjusting the shaker settings

When using a plate shaker for the washing and elution steps, the speed settings have to be adjusted carefully for each specific separation plate and shaker to prevent cross-contamination from well to well. Proceed as follows:

Adjusting shaker speed for binding and wash steps:

- Load 1000 μL (for checking the settings for the binding step) or 600 μL (for checking the settings for the washing steps) dyed water to the wells of the separation plate. Place the plate on the shaker and start shaking with a moderate speed setting for 30 seconds. Turn off the shaker and check the plate surface for small droplets of dyed water.
- Increase speed setting, shake for an additional 30 seconds, and check the plate surface for droplets again.
- Continue increasing the speed setting until you observe droplets on top of the separation plate. Reduce speed setting, check again, and use this setting for the washing step.

Adjusting shaker speed for the elution step:

- Load 100 μL dyed water to the wells of the collection plate and proceed as described above.

2.5 Handling of beads

Distribution of beads

A homogeneous distribution of the magnetic beads to the individual wells of the separation plate is essential for a high well-to-well consistency. Therefore, before distributing the beads, make sure that the beads are completely resuspended. Shake the storage bottle well or place it on a vortexer shortly. Premixing magnetic beads with the binding buffer allows easier homogenous distribution of the beads to the individual wells of the separation plate. During automation, a premix step before aspirating the beads/binding buffer mixture from the reservoir is recommended to keep the beads resuspended.

Magnetic separation time

Attraction of the magnetic beads to the magnetic pins depends on the magnetic strength of the magnetic pins, the selected separation plate, distance of the separation plate from the magnetic pins, and the volume to be processed. The individual times for complete attraction of the beads to the magnetic pins should be checked and adjusted on each system. It is recommended using the separation plates or tubes specified by the supplier of the magnetic separator.

Washing the beads

Washing the beads can be achieved by shaking or mixing. In contrast to mixing by pipetting up and down, mixing by shaker or magnetic mixing allows simultaneous mixing of all samples. This reduces the time and number of tips needed for the preparation. Resuspension by pipetting up and down, however, is more efficient than mixing by a shaker or magnetic mix.

Method	Resuspension efficiency	Speed	Number of tips needed
Magnetic mix	+	++	Low
Shaker	++	++	Low
Pipetting	+++	+*	High

2.6 Elution procedures

Purified viral RNA / DNA can be eluted directly with the supplied Elution Buffer MV6. Elution can be carried out in a volume of $\geq 50 \mu\text{L}$. It is essential to cover the NucleoMag[®] Beads completely with elution buffer during the elution step. The volume of dispensed elution buffer depends on the magnetic separation system (e.g., the position of the pellet inside the separation plate). For efficient elution, the magnetic bead pellet should be resuspended completely in the elution buffer. For some separators, high elution volumes might be necessary to cover the whole pellet.

* 8-channel pipetting device

3 Storage conditions and preparation of working solutions

Attention: Buffers MVL, MV2, and MV3 contain chaotropic salt! Wear gloves and goggles!

- All components of the **NucleoMag® Virus** kit should be stored at room temperature (18– 25 °C) and are stable for up to one year.
- All buffers are delivered ready to use.
- **Lysis Buffer MVL:**
Lysis Buffer MVL may form salt precipitates upon storage. To re-dissolve the salt precipitate incubate the buffer bottle at 40 °C until all of the precipitate is re-dissolved.
Lysis Buffer MVL with Carrier RNA: Lysis Buffer MVL with added Carrier RNA can be stored at room temperature for 1–2 weeks.

Frequent warming, temperatures > 80 °C, and extended heat incubation will cause degradation of the Carrier RNA. This leads to reduced recovery of viral RNA and eventually false negative RT-PCR results, in particular, if low-titer samples are used. Do not warm Buffer MVL containing Carrier RNA more than 6 times!

Before starting any **NucleoMag® Virus** protocol, prepare the following:

- **Proteinase K:** Before first use of the kit, add 1.1 mL Proteinase Buffer PB to each vial of the **lyophilized Proteinase K**. Dissolved Proteinase K solution should be stored in aliquots at - 20 °C.
- **Carrier RNA:** Before first use of the kit, add 440 µL Carrier RNA Buffer to each vial **lyophilized Carrier RNA**. Store dissolved Carrier RNA solution in aliquots at - 20 °C.

NucleoMag® Virus		
REF	1 x 96 preps 744800.1	4 x 96 preps 744800.4
Proteinase K (lyophilized)	1 vial (20 mg) Add 1.1 mL Proteinase Buffer	4 vials (20 mg/vial) Add 1.1 mL Proteinase Buffer to each vial
Carrier RNA (lyophilized)	1 vial (400 µg) Add 440 µL Carrier RNA Buffer	4 vials (400 µg/vial) Add 440 µL Carrier RNA Buffer to each vial









4 Safety instructions

The following components of the **NucleoMag® Virus** kits contain hazardous contents.

Wear gloves and goggles and follow the safety instructions given in this section.

Only harmful features do not need to be labeled with H and P phrases up to 125 mL or 125 g.

Mindergefährliche Eigenschaften müssen bis 125 mL oder 125 g nicht mit H- und P-Sätzen gekennzeichnet werden.

Component	Hazard contents	GHS symbol	Hazard phrases	Precaution phrases
Inhalt	Gefahrstoff	GHS-Symbol	H-Sätze	P-Sätze
MVL	guanidine hydrochloride 50–66 % <i>Guanidinhydrochlorid 50–66 %</i> CAS 50-01-1	 WARNING ACHTUNG	302, 315, 319	264, 280, 301+312, 302+352, 305+351+338, 330, 332+313, 337+313
MV2	sodium perchlorate 20–40 % and ethanol 35–55 % <i>Natriumperchlorat 20–40 % und Ethanol 35–55 %</i> CAS 7601-89-0 CAS 64-17-5	  WARNING ACHTUNG	226, 302	210, 233, 301+312, 330, 370+378, 403+235
MV3	sodium perchlorate 5–20 % and ethanol 20–35 % <i>Natriumperchlorat 5–20 % und Ethanol 20–35 %</i> CAS 7601-89-0 CAS 64-17-5	 WARNING ACHTUNG	226	210, 233, 370+378, 403+235
MV4	ethanol 55–75 % <i>Ethanol 35–55 %</i> CAS 64-17-5b	 WARNING ACHTUNG	225	210, 233, 370+378, 403+235
Carrier RNA Buffer	guanidinium thiocyanate 30–60 % <i>Guanidinthiocyanat 30–60 %</i> CAS 593-84-0	 WARNING ACHTUNG	302, 412, EUH031	260, 273, 301+312, 330
Proteinase K	proteinase K <i>Proteinase K</i> CAS 39450-01-6	  DANGER GEFAHR	317, 334	261, 272, 280, 302+352, 304+340, 333+313, 342+311, 363



The symbol shown on labels refers to further safety information in this section.

Das auf Etiketten dargestellte Symbol weist auf weitere Sicherheitsinformationen dieses Kapitels hin.

Hazard phrases

- H 225 Highly flammable liquid and vapour.
Flüssigkeit und Dampf leicht entzündbar.
- H 226 Flammable liquid and vapour.
Flüssigkeit und Dampf entzündbar.
- H 302 Harmful if swallowed.
Gesundheitsschädlich bei Verschlucken.
- H 315 Causes skin irritation.
Verursacht Hautreizungen.
- H 317 May cause an allergic skin reaction.
Kann allergische Hautreaktionen verursachen.
- H 319 Causes serious eye irritation.
Verursacht schwere Augenreizung.
- H 334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Kann bei Einatmen Allergie, asthmaartige Symptome oder Atembeschwerden verursachen.
- H 412 Harmful in contact with skin.
Schädlich für Wasserorganismen, mit langfristiger Wirkung.
- EUH 031 Contact with acids liberates toxic gas.
Entwickelt bei Berührung mit Säure giftige Gase.

Precaution phrases

- P 210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Von Hitze, heißen Oberflächen, Funken, offenen Flammen sowie anderen Zündquellenarten fernhalten. Nicht rauchen.
- P 233 Keep container tightly closed.
Behälter dicht verschlossen halten.
- P 260 Do not breathe dust / fume / gas / mist / vapours / spray.
Staub/Rauch/Gas/Nebel/Dampf/Aerosol nicht einatmen.
- P 261 Avoid breathing dust / fume / gas / mist / vapours / spray.
Einatmen von Staub/Rauch/Gas/Nebel/Dampf/Aerosol vermeiden.
- P 264 Wash ... thoroughly after handling.
Nach Handhabung ... gründlich waschen.
- P 272 Contaminated work clothing should not be allowed out of the workplace.
Kontaminierte Arbeitskleidung nicht außerhalb des Arbeitsplatzes tragen.
- P 273 Avoid release to the environment.
Freisetzung in die Umwelt vermeiden.
- P 280 Wear protective gloves / protective clothing / eye protection / face protection.
Schutzhandschuhe / Schutzkleidung / Augenschutz / Gesichtsschutz tragen.
- P 301+312 IF SWALLOWED: Call a POISON CENTER / doctor / ... / if you feel unwell.
BEI VERSCHLUCKEN: Bei Unwohlsein GIFTINFORMATIONSZENTRUM/Arzt/... anrufen.
- P 302+352 IF ON SKIN: Wash with plenty of water / ...
BEI BERÜHRUNG MIT DER HAUT: Mit viel Wasser/... waschen.
- P 304+340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
BEI EINATMEN: Die Person an die frische Luft bringen und für ungehinderte Atmung sorgen.

- P 305+351+338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
BEI KONTAKT MIT DEN AUGEN: Einige Minuten lang behutsam mit Wasser ausspülen. Eventuell vorhandene Kontaktlinsen nach Möglichkeit entfernen. Weiter ausspülen.
- P 330 Rinse mouth.
Mund ausspülen.
- P 332+313 If skin irritation occurs: Get medical advice / attention.
Bei Hautreizung: Ärztlichen Rat einholen / ärztliche Hilfe hinzuziehen.
- P 333+313 If skin irritation or rash occurs: Get medical advice/attention.
Bei Hautreizung oder -ausschlag: Ärztlichen Rat einholen/ärztliche Hilfe hinzuziehen.
- P 337+313 If eye irritation persists: Get medical advice / attention.
Bei anhaltender Augenreizung: Ärztlichen Rat einholen/ärztliche Hilfe hinzuziehen.
- P 342+311 If experiencing respiratory symptoms: Call a POISON CENTER / doctor / ...
Bei Symptomen der Atemwege: GIFTINFORMATIONSZENTRUM/Arzt/... anrufen.
- P 363 Wash contaminated clothing before reuse.
Kontaminierte Kleidung vor erneutem Tragen waschen.
- P 370+378 In case of fire: Use all extinguisher media to extinguish.
Bei Brand: Alle Löschmittel zum Löschen verwenden.
- P 403+235 Store in a well-ventilated place. Keep cool.
An einem gut belüfteten Ort aufbewahren. Kühl halten.

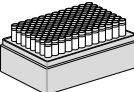
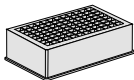

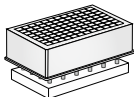
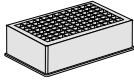

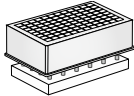
5 Protocol for the isolation of viral RNA/DNA from cell-free body fluids

Protocol at a glance

- For hardware requirements refer to section 2.3.
- For detailed information on each step see page 16.

Before starting the preparation:

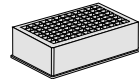
- Check if Proteinase K and Carrier RNA were prepared according to section 3.

<p>1 Lyse sample</p>	<p>10 μL Proteinase K 200 μL sample 4 μL Carrier RNA 200 μL MVL</p> <p>Mix</p> <p>56 °C, 10 min</p>			
<p>2 Bind viral RNA/ DNA to NucleoMag® V-Beads</p>			<p>30 μL V-Beads 600 μL MV2</p>	
<p>Mix by shaking for 5 min at RT <i>(Optional: Mix by pipetting up and down)</i></p>				
<p>Remove supernatant after 2 min separation</p>				
<p>3 Wash with MV3</p>	<p>Remove Square-well Block from NucleoMag® SEP</p> <p>500 μL MV3</p>			
<p>Resuspend: Shake 1 min at RT</p>				
<p>Remove supernatant after 2 min separation</p>				

NucleoMag[®] Virus

4 Wash with MV4

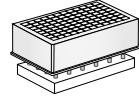
**Remove Square-well Block
from NucleoMag[®] SEP**
500 μ L MV4



**Resuspend: Shake 1 min at
RT**



**Remove supernatant
after 2 min separation**

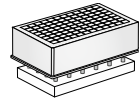


5 Wash with MV5

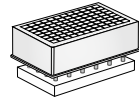
550 μ L MV5

Incubate for 45–60 s

*Note: Do not resuspend
the beads in Buffer MV5!*

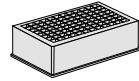


Remove supernatant



6 Elute RNA/DNA

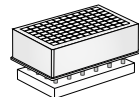
**Remove Square-well Block
from NucleoMag[®] SEP**
50–100 μ L MV6



Shake 5 min at 56 °C
*(Optional: Mix by pipetting
up and down)*



**Separate 2 min and transfer
viral RNA/DNA
into elution plate/tubes**



Detailed protocol

This protocol is designed for magnetic separators with static pins (e.g., NucleoMag® SEP) and suitable plate shakers. It is recommended using a Square-well Block for separation (see section 6.2 ordering information). Alternatively, isolation of viral RNA/DNA can be performed in reaction tubes with suitable magnetic separators. This protocol is for manual use and serves as a guideline for adapting the kit to robotic instruments.

1 Lyse sample

Predispense **10 µL Proteinase K** and **200 µL of sample** to a suitable reaction tube. Add **200 µL Buffer MVL** (with added Carrier RNA) to the reaction tube (If Carrier RNA is not premixed with the Buffer MVL, add 4 µL of the stock solution to the reaction tube). Mix well by repeated pipetting up and down and incubate at **56 °C for 10 min**. Alternatively, lysis step can be performed in Tube Strips (see section 6.2 ordering information).

For higher convenience a premix of Proteinase K, Buffer MVL, and Carrier RNA can be prepared. This premix should be added to the sample immediately (within 15 min after preparation).

Following the lysis incubation, spin down to collect any sample from the lysis tube lids and transfer each lysate to the wells of a Square-well Block.

2 Bind viral RNA/DNA to magnetic beads

Add **30 µL resuspended V-Beads** and **600 µL Buffer MV2** to the lysed sample.

Mix by pipetting up and down 6 times and **shake for 5 min at room temperature**. Alternatively, when processing the kit without a shaker, pipette up and down 10 times and incubate for 5 min at room temperature.

NucleoMag® V-Beads and Buffer MV2 can be premixed.

Be sure to resuspend the NucleoMag® V-Beads before removing them from the storage bottle. Vortex storage bottle briefly until a homogenous suspension has been formed.

Separate the magnetic beads against the side of the wells by placing the Square-well Block on the NucleoMag® SEP a magnetic separator. Wait at least **2 min** until all the beads have been attracted to the magnets. Remove and discard supernatant by pipetting.

Do not disturb the attracted beads while aspirating the supernatant.

3 Wash with MV3

Remove the Square-well Block from the NucleoMag® SEP magnetic separator. Add **500 µL Buffer MV3** and resuspend the beads by shaking until the beads are resuspended completely (1–3 min). Alternatively, resuspend beads completely by repeated pipetting up and down.

Separate the magnetic beads by placing the Square-well Block on the NucleoMag® SEP magnetic separator. Wait at least 2 min until all the beads have been attracted to the magnet. Remove and discard supernatant by pipetting.

4 Wash with MV4

Remove the Square-well Block from the NucleoMag® SEP magnetic separator. Add **500 µL Buffer MV4** and resuspend the beads by shaking until the beads are resuspended completely (1–3 min). Alternatively, resuspend beads completely by repeated pipetting up and down.

Separate the magnetic beads by placing the Square-well Block on the NucleoMag® SEP magnetic separator. Wait at least **2 min** until all the beads have been attracted to the magnet. Remove and discard supernatant by pipetting.

5 Wash with MV5

Leave the Square-well Block on the NucleoMag® SEP magnetic separator. Gently add **550 µL Buffer MV5** to each well and incubate for **45–60 s** while the beads are still attracted to magnets. Then aspirate and discard the supernatant.

Do not resuspend the beads in Buffer MV5. This step is to remove traces of ethanol and eliminates a drying step. Do not exceed incubation time of max. 1 min.

6 Elution

Add desired volume of **Buffer MV6 (50–100 µL)** to each well of the Square-well Block and resuspend the beads by shaking **5 min** at **56 °C**. Alternatively, resuspend beads completely by repeated pipetting up and down and incubate for **5 min** at **56 °C**.

Separate the magnetic beads by placing the Square-well Block on the NucleoMag® SEP magnetic separator. Wait at least **2 min** until all the beads have been attracted to the magnets. Transfer the supernatant containing the purified viral RNA/DNA to either microtubes or Tube Strips (see section 6.2 ordering information).

6 Appendix

6.1 Troubleshooting

Problem	Possible cause and suggestions
Poor yield/low sensitivity	<i>Insufficient elution buffer volume</i>
	<ul style="list-style-type: none"> <li data-bbox="288 352 927 376">• Beads pellet must be covered completely with elution buffer.
	<i>Insufficient performance of elution buffer during elution step</i>
	<ul style="list-style-type: none"> <li data-bbox="288 438 969 518">• Remove residual buffers during the separation steps completely. Remaining buffers decrease the efficiency of following wash and elution steps.
Poor yield/low sensitivity	<i>Beads dried out</i>
	<ul style="list-style-type: none"> <li data-bbox="288 577 921 625">• Do not let the beads dry as this might result in lower elution efficiencies.
	<i>Aspiration of attracted bead pellet</i>
Poor yield/low sensitivity	<ul style="list-style-type: none"> <li data-bbox="288 687 936 767">• Do not disturb the attracted beads while aspirating the supernatant, especially when the magnetic bead pellet is not visible in the lysate.
	<i>Aspiration and loss of beads</i>
	<ul style="list-style-type: none"> <li data-bbox="288 829 953 877">• Time for magnetic separation too short or aspiration speed too high.
Low purity / low sensitivity	<i>Insufficient washing procedure</i>
	<ul style="list-style-type: none"> <li data-bbox="288 946 958 1026">• Use only the appropriate combinations of separator and plate, for example, Square-well Block in combination with NucleoMag® SEP. <li data-bbox="288 1045 958 1121">• Make sure that beads are resuspended completely during the washing procedure. If shaking is not sufficient to resuspend the beads completely mix by repeated pipetting up and down.
Poor performance of RNA in downstream applications	<i>Carry-over of ethanol from wash buffers</i>
	<ul style="list-style-type: none"> <li data-bbox="288 1189 969 1236">• Be sure to remove all of the ethanolic wash solution Buffer MV4, as residual ethanol interferes with downstream applications.
Poor performance of RNA in downstream applications	<i>Ethanol evaporation from wash buffers</i>
	<ul style="list-style-type: none"> <li data-bbox="288 1283 969 1362">• Close buffer bottles tightly, avoid ethanol evaporation from buffer bottles as well as from buffer filled in reservoirs. Do not reuse buffers from buffer reservoirs.

Problem **Possible cause and suggestions**

Carry-over of beads	<i>Time for magnetic separation too short</i>
	<ul style="list-style-type: none"> • Increase separation time to allow the beads to be completely attracted to the magnetic pins before aspirating any liquid from the well.
	<i>Aspiration speed too high (elution step)</i>
	<ul style="list-style-type: none"> • High aspiration speed during the elution step may cause bead carry-over. Reduce aspiration speed for elution step.

6.2 Ordering information

Product	REF	Pack of
NucleoMag® Virus	744800.1	1 x 96 preps
	744800.4	4 x 96 preps
NucleoMag® SEP	744900	1
Square-well Blocks	740481	4
	740481.24	24
Self adhering PE Foil	740676	50 sheets
Rack of Tube Strips (set consists of 1 Rack, 12 Tube Strips with 8 tubes each, and 12 Cap Strips)	740477	4 sets
	740477.24	24 sets
KingFisher® Accessory Kit A (set consists of Square-well Blocks, Deep-well Tip Combs, Elution Plates for 4 x 96 NucleoMag® Virus preps using King Fisher® Flex platform)	744950	1 set
KingFisher® Duo Accessory Kit (set consists of KingFisher® Deep-well Blocks, KingFisher® Duo 12 Tip Combs, KingFisher® Duo Elution Strips for 8 x 12 NucleoMag® Virus preps using KingFisher® Duo/Duo Prime platform)	744952	1 set

Visit www.mn-net.com for more detailed product information.

6.3 Product use restriction / warranty

NucleoMag® Virus kit components are intended, developed, designed, and sold FOR RESEARCH PURPOSES ONLY, except, however, any other function of the product being expressly described in original MACHEREY-NAGEL product leaflets.

MACHEREY-NAGEL products are intended for GENERAL LABORATORY USE ONLY! MACHEREY-NAGEL products are suited for QUALIFIED PERSONNEL ONLY! MACHEREY-NAGEL products shall in any event only be used wearing adequate PROTECTIVE CLOTHING. For detailed information please refer to the respective Material Safety Data Sheet of the product! MACHEREY-NAGEL products shall exclusively be used in an ADEQUATE TEST ENVIRONMENT. MACHEREY-NAGEL does not assume any responsibility for damages due to improper application of our products in other fields of application. Application on the human body is STRICTLY FORBIDDEN. The respective user is liable for any and all damages resulting from such application.

DNA/RNA/PROTEIN purification products of MACHEREY-NAGEL are suitable for *IN VITRO*-USES ONLY!

ONLY MACHEREY-NAGEL products specially labeled as IVD are also suitable for *IN VITRO*-diagnostic use. Please pay attention to the package of the product. *IN VITRO*-diagnostic products are expressly marked as IVD on the packaging.

IF THERE IS NO IVD SIGN, THE PRODUCT SHALL NOT BE SUITABLE FOR *IN VITRO*-DIAGNOSTIC USE!

ALL OTHER PRODUCTS NOT LABELED AS IVD ARE NOT SUITED FOR ANY CLINICAL USE (INCLUDING, BUT NOT LIMITED TO DIAGNOSTIC, THERAPEUTIC AND/OR PROGNOSTIC USE).

No claim or representations is intended for its use to identify any specific organism or for clinical use (included, but not limited to diagnostic, prognostic, therapeutic, or blood banking). It is rather in the responsibility of the user or - in any case of resale of the products - in the responsibility of the reseller to inspect and assure the use of the DNA/RNA/protein purification products of MACHEREY-NAGEL for a well-defined and specific application.

MACHEREY-NAGEL shall only be responsible for the product specifications and the performance range of MN products according to the specifications of in-house quality control, product documentation and marketing material.

This MACHEREY-NAGEL product is shipped with documentation stating specifications and other technical information. MACHEREY-NAGEL warrants to meet the stated specifications. MACHEREY-NAGEL's sole obligation and the customer's sole remedy is limited to replacement of products free of charge in the event products fail to perform as warranted. Supplementary reference is made to the general business terms and conditions of MACHEREY-NAGEL, which are printed on the price list. Please contact us if you wish to get an extra copy.

There is no warranty for and MACHEREY-NAGEL is not liable for damages or defects arising in shipping and handling (transport insurance for customers excluded), or out of accident or improper or abnormal use of this product; defects in products or

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Please contact:
MACHEREY-NAGEL GmbH & Co. KG
Tel.: +49 24 21 969-270
tech-bio@mn-net.com

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Plasmid DNA
Clean-up
RNA
Genomic DNA
Viral RNA and DNA
Protein
High throughput
Accessories
Auxiliary tools



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MACHEREY-NAGEL



MACHEREY-NAGEL GmbH & Co. KG · Neumann-Neander-Str. 6-8 · 52355 Düren · Germany

DE / International:

Tel.: +49 24 21 969-0
 Fax: +49 24 21 969-199
 E-mail: info@mn-net.com

CH:

Tel.: +41 62 388 55 00
 Fax: +41 62 388 55 05
 E-mail: sales-ch@mn-net.com

FR:

Tel.: +33 388 68 22 68
 Fax: +33 388 51 76 88
 E-mail: sales-fr@mn-net.com

US:

Tel.: +1 484 821 0984
 Fax: +1 484 821 1272
 E-mail: sales-us@mn-net.com