Instruction Manual

FastRNA™ Pro Red Kit

Rapid Isolation of Total RNA from Yeast and Fungus using the FastPrep® Instrument

- One Call
- One Source
- A World of Biotechnology Reagents

Size:
50 preps

Storage:
Refrigerated or Ambient temperature
(4° C or 15 - 30° C)

Cat. No. 116035050

Protocol Revision #116035050-201411

DO NOT expose RNApro™ Solution to light for extended periods of time. Store in the original bottle in the closed kit box.

Note: An empty space in the box insert has been provided for convenient storage and access to the RNApro™ Solution when it has been removed from the safety shipping container.

MSDS now available online

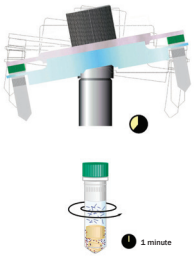
www.mpbio.com/sampleprep

MP™

FastPrep® Family Workflow

Select the Best Homogenization and Extraction Solution for your Application.

Homogenization



Instruments


FastPrep-24™ 5G


FastPrep-96™


Super FastPrep-1™

Adapters


Metal


Cryogenic


High throughput


Large Sample volume

Lysing Matrix

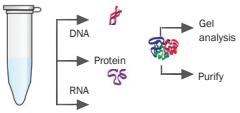

2mL


4,5mL


15mL


50mL

Extraction



DNA, RNA & Protein Isolation Kits

DNA

RNA

Protein

www.mpbio.com/sampleprep

FastRNA™ Pro Red Kit

Rapid Isolation of Total RNA from Yeast and Fungus using the FastPrep® Instrument

50 preps

Storage:
Refrigerated or Ambient temperature
(4° C or 15 - 30° C)

Catalog #116035050

Revision # 116035050-201411

TABLE OF CONTENTS

1. Introduction to the FastRNA™ Pro Red Kit and the FastPrep® Instrument 5
2. Kit Components and User Supplied Materials 5
   2. 1 FastRNA™ Pro Red Kit Components 5
   2.2 User Supplied Materials 6
3. Important Considerations before Use 7
4. Safety Precautions 5
5. Protocol 8
6. Table of Typical FastPrep® Settings 12
7. Troubleshooting 12
   7.1 Degraded RNA or Lower than Expected Yields 12
   7.2 No Pellet after Ethanol Precipitation 13
   7.3 Genomic DNA Contamination 14
   7.4 Mucopolysaccharide/Carbohydrate Contamination 14
   7.5 Lithium Chloride Precipitation 14
8. Related Products 15
9. References 15
10. Product Use Limitation & Warranty 16

1. Introduction to the FastRNA™ Pro Red Kit and the FastPrep® Instrument

The FastRNA™ Pro Red Kit is a single reagent extraction method designed to quickly and efficiently isolate total cellular RNA from yeast and fungus. The RNAPro™ Solution included in the kit is designed to efficiently inactivate cellular RNases during cell lysis to prevent RNA degradation. During use the RNAPro™ Solution is mixed with the sample in a tube containing a specifically selected lysing matrix. The tube is then processed in the FastPrep® Instrument for 40 seconds to release the total cellular RNA, DNA and proteins. Following the FastPrep® homogenization, the RNA is purified and isolated by chloroform extraction and ethanol precipitation. The purified RNA is ready for downstream applications, including RT-PCR and northern analysis. The average RNA yield from 1010 yeast cells is greater than 45 µg.

The FastPrep® Instrument is a high-speed, benchtop device that uses a proprietary vertical angular motion (1) to produce sample homogenization by simultaneous matrix impaction from multiple directions. The FastPrep® Instrument provides an extremely quick and highly reproducible homogenization that surpasses traditional lysis methods using enzyme digestion, sonication, blending, douncing and vortexing. When used with FastPrep® kits the FastPrep® Instrument permits the release and purification of intact DNA, RNA and proteins from virtually any source, including yeast, fungi, bacteria, spores, plant seeds and leaves, animal tissue, organs and blood, etc.

2. Kit Components and User Supplied Materials

2.1 FastRNA™ Pro Red Kit Components

Product Description	Qty.	Cat. No.
RNApro™ Solution	2 x 27.5 mL bottles	116055050
DEPC-H_2O	1 x 15 mL bottle	111007201
Lysing Matrix C	50 x 2 mL tubes	116912050
Short protocol	1 each	
User manual	1 each	
MSDS	1 each	
Certificate of Analysis	1 each	

2.2 User Supplied Materials

FastPrep® Instrument (See section 8)
Microcentrifuge
Pipettmen
RNase Erase® (Cat # 112440204), recommended
Chloroform
100% ethanol
75% ethanol
1.5 or 2.0 mL RNase-free microcentrifuge tubes
Agarose
Gel loading dye and RNA size marker

3. Important Considerations before Use

The presence or introduction of RNase during the procedure may result in sample degradation. It is strongly recommended that the user minimize the potential for RNase contamination by using gloves throughout the procedure, using DEPC-H_2O and by treating pipettmen, work area, gel box and gel comb with RNase Erase®. Additional RNA handling methods and precautions may be found in references 2 and 3.

The volume after the addition of RNApro™ Solution to the sample has been calculated to maintain a sufficient air space in the sample tube during FastPrep® Instrument processing. Sample loss or tube failure may result from overfilling the matrix tube. The matrix tube caps must be secure, but not overtightened, to prevent sample leakage. If the sample is too large for processing in a single tube, divide the sample and process using multiple tubes.

Confirm the sample tubes spin freely and will not scrape the microcentrifuge wall during centrifugation.
The use of other manufactured tubes in the FastPrep® Instrument is not recommended and may result in sample loss or FastPrep® Instrument failure.

Add the RNApro™ Solution to the sample as soon as possible to initiate RNase inhibition.
Samples, both FastPrep® Instrument homogenized and non-homogenized, are stable in RNApro™ Solution overnight at room temperature or 4°C.

Bacterial strain variability may result in unwanted protein and mucopolysaccharide carryover into the aqueous solution following chloroform extraction. While this may not compromise downstream applications the user may adapt the protocol to include an additional chloroform (isoamyl alcohol may be included with the chloroform [CHCl3:IAA, 24:1, v:v]) extraction after Step 10 (Quick Protocol for Experienced Users) or in Step 12 (Detailed Procedure) to reduce the potential carryover.

A single 40 second run at a speed setting of 6.0 in the FastPrep® Instrument is sufficient to lyse a bacterial sample. If the user determines that additional processing steps in the FastPrep® Instrument are required to homogenize a sample it is recommended that the sample be incubated on ice in the sample tube for at least 2 minutes between successive FastPrep® Instrument homogenizations to prevent sample heating and possible RNA degradation.

The FastRNA™ Pro Red Kit is designed to selectively purify total cellular RNA from DNA and protein. Experiments have indicated the RNA is sufficiently pure for use in RT-PCR and northern analysis, however, it is recommended the user incorporate DNase I treatment of the RNA prior to use in applications where absolute control of DNA contamination is essential. Use DNase I at the concentration recommended by the manufacturer and incubate at 37°C for 30 minutes. The DNase I is inactivated by incubation at 75°C for 5 minutes or by addition of EDTA to 25 mM followed by phenol/chloroform extraction and precipitation (2, 3).

4. Safety Precautions

The RNApro™ Solution contains components that when in contact with human tissue or during inhalation may cause irritation or burning. Wear personal protective equipment to prevent skin contact (e.g., gloves, lab coat, and eye protection) and prevent inhalation of reagent vapors and consumption of liquid during use. Consult the enclosed Material Safety Data Sheet for additional details.

5. Protocol

1. For Yeast Cells in Culture:
Dilute 1 mL of an overnight yeast culture into 14 mL of fresh media in a sterile 50 mL tube or 250 mL flask.

Incubate for ~4–6 hours at 37 °C with shaking at ~50–200 rpm to reach an OD600 = 0.9–1.0 *(Note: The relationship between OD and cell concentration varies between species. As a guideline for yeast, use 1.0 OD600 is ~1 X 10^9 cells per milliliter).*
Remove 10 mL of the culture to a 15 mL conical tube and pellet the cells by centrifugation at 2 800 rpm (x 1 500 g) for 15 minutes at 4 °C (e.g., Beckman Model TJ-6 Centrifuge, I-92 Swinging Bucket Rotor) for 10 minutes.

Decant the supernatant and add 1 mL of RNApro™ Solution to the tube.

Completely resuspend the cells by pipetting or vortexing. Transfer 1 mL of the resuspended mixture to a red-cap tube containing Lysing Matrix C provided in the kit.

For Cell Pellets or Fungal Tissue:

Add 1 mL of RNAPro™ Solution to a red-cap tube containing Lysing Matrix C provided in the kit. Add 100 mg fungal tissue or pelleted cells to the sample tube.

2. Securely close the cap of the Lysing Matrix C tube to prevent leakage during homogenization.
NOTE: The calculated volumes will provide adequate airspace in the matrix tube to prevent sample leakage and/or tube failure. DO NOT overfill the matrix tube. To process a greater number of cells or larger sample, use a second matrix tube.

3. Process the sample tube in the FastPrep® Instrument for 40 seconds at a setting of 6.0.

4. Remove the sample tube and centrifuge at a minimum of 12 000 x g for 5 minutes at 4 °C or room temperature.

5. Transfer liquid (~750 µL) to a new microcentrifuge tube. Avoid transferring the debris pellet and lysing matrix.

6. Incubate the transferred sample 5 minutes at room temperature to increase RNA yield.

7. Add 300 µL of chloroform (NO isoamyl alcohol). Vortex 10 seconds.

8. Incubate 5 minutes at room temperature to permit nucleoprotein dissociation and increase RNA purity.

9. Centrifuge the tubes at a minimum of 12 000 x g for 5 minutes at 4°C. Samples containing large amounts of cellular mucopolysaccharides can be re-extracted with chloroform (isoamyl alcohol may be included with the chloroform [CHCl3:IAA, 24:1, v:v]) to increase RNA purity. Alternatively, a lithium chloride precipitation may be used (see the Troubleshooting section and references 3, 4).

10. Transfer the upper phase to a new microcentrifuge tube without disturbing the interphase. If a portion of the interphase is transferred, repeat the centrifugation with the upper phase, and transfer the new upper phase to a clean microcentrifuge tube.

11. Add 500 µL of cold absolute ethanol to the sample, invert 5X to mix and store at -20°C for at least 30 minutes.

12. Centrifuge at a minimum of 12 000 x g for 15 minutes at 4°C and remove the supernatant. The RNA will appear as a white pellet in the tube. If the pellet is floating, the sample may be recentrifuged to place the pellet at the tube bottom.

13. Wash the pellet with 500 µl of cold 75% ethanol (made with DEPC-H_2O).

14. Remove the ethanol, air dry 5 minutes at room temperature (DO NOT completely dry the RNA) and resuspend the RNA in 100 µl of DEPC-H_2O for short-term storage. RNA is generally stable for up to a year at -80°C. For longer term storage RNA samples may be stored at -20°C as ethanol precipitates. When stored as an ethanol precipitate the RNA must be precipitated and resuspended in aqueous solution prior to use.
NOTE: RNA does not evenly distribute in ethanol and can lead to inconsistent RNA amounts between samples when equal volumes are pipetted. Vortex the RNA:ethanol solution to disperse the RNA prior to removing the sample. In situations where precise amounts of RNA are required, it is best to precipitate the total amount (or excess) of RNA required, resuspend the RNA in DEPC-H_2O and measure the concentration by OD260 before proceeding.

15. Incubate 5 minutes at room temperature to facilitate RNA resuspension.

16. Determine the RNA concentration:
a. Dilute 5 µL of the purified RNA into 495 µL of DEPC-H_2O
b. Read the OD260 using DEPC-H_2O as a blank
c. Calculate the sample µg RNA per mL using the formula:
(OD260)(40 µg/mL/per OD)(100 [dilution factor]) = µg RNA per mL

Spectrophotometer accuracy is greatest between ~0.2 and ~0.8. If the OD reading is below the range, add more RNA sample (e.g., 20 µL RNA + 480 µL DEPC-H_2O) or concentrate the RNA by precipitation and resuspension into a smaller volume. If the OD reading is above the recommended spectrophotometer range, use less RNA for the OD determination.

17. Aliquot and store the RNA solution at -70°C.

18. The RNA integrity can be determined by analyzing a portion of the RNA sample using gel electrophoresis. Add 1 µg RNA in 9 µL DEPC-H_2O, heat to 65°C for 5 minutes, add gel loading buffer (see Related Products) and load the sample on a 1.2% agarose gel containing 2.2M formaldehyde in MOPS buffer. The sample is run at ~80 volts for 30 minutes (2,3). Ethidium bromide may be added to the denatured RNA sample at a final concentration of 10 mg per milliliter prior to gel loading or the gel may be ethidium bromide stained and destained following electrophoresis and visualized under UV light. The quality of the RNA is determined by the appearance of ribosomal RNAs as sharp, distinct bands (18S/2.0kb and 26S/3.8kb for yeast). Heterogeneous-sized messenger RNA may appear as a diffuse ethidium staining between and below the ribosomal bands.
Small RNA species such as tRNA and 5S RNA may be present in varying amounts at the dye front.

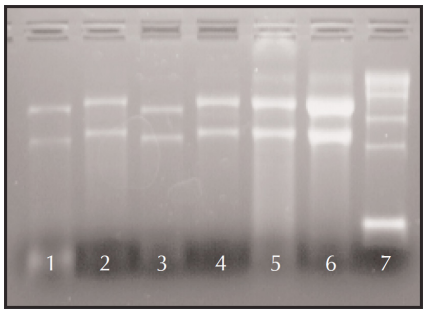
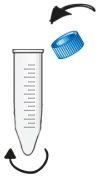


Figure 1: Yeast and fungal total RNA extracted with the FastRNA™ Pro Red Kit. Approximately 2% of the total RNA isolated from 100 mg tissue or 1010 cells was loaded onto a 1.2% denaturing agarose gel (1XMOPS).
Lane 1: S. pombe;
Lane 2: S. cerevisiae
Lane 3: P. pastoris
Lane 4: C. albicans;
Lane 5: common mushroom;
Lane 6: small common mushroom;
Lane 7: 0.24-9.5kb RNA Ladder.

FastRNA™ Pro Red KIT

1. Prepare the sample

15 mins
1 500 g
4°C

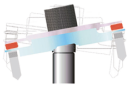


15 ml Tube

- Dilute 1 ml of an overnight bacterial culture into 14 ml of fresh media.
- Remove 10 ml of the culture to a 15 ml canonical tube.
- Centrifuge to pellet cells.
- Decant the supernatant and add 1 ml of RNAPro Solution to the tube.
- Resuspend the cells by pipetting.

2. Homogenize in the FastPrep® instrument

40 sec.



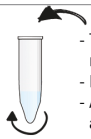
5 mins
12 000 g
4°C

- Transfert 1 ml of the bacterial solution mixture to a Lysing Matrix B tube.
- Load tube in FastPrep® instrument. Process 40s at a speed setting of 6.0m/s

Centrifuge to pellet debris.

3. Extract RNA

2 mins
12 000
4°C



2 ml Tube

- Transfer supernatant to a clean 2ml microcentrifuge tube.
- Incubate 5 mins at Room Temperature (RT)
- Add 300µL of chloroform, vortex 10 sec and incubate 5 mins at RT & centrifuge.

4. Precipitate RNA

15 mins
12 000 g
4°C

2 ml Tube

- Transfer the upper phase to a new microcentrifuge tube.
- Add 500µL of cold absolute ethanol
- Invert 5x to mix and store at -20°C for 30 mins at least.
- Centrifuge & remove the supernatant

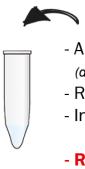
5. Wash the precipitated RNA

2 ml Tube

- Add 500 µL of cold 75% ethanol (made with DEPC-H_2O)

- Remove the ethanol

6. Dry and Resuspend the RNA



- Air dry 5 mins at Room Temperature
(do not completely dry the RNA).
- Resuspend the RNA in 100µL of DEPC-H_2O.
- Incubate 5 mins at Room Temperature.

- RNA is ready to use

6. Table of Typical FastPrep® Settings

Sample Name	Sample type	Quantity	Lysing Matrix	FastPrep speed	FastPrep Time
Yeast & Fungi					
Saccharomyces cerevisiae	Cells	$2x10^8$ cells	C	6.0	40 sec
Schizosaccharomyces pombe	Cells	10^8 cells	C	5.0	4x15 sec
Candida albicans	Cells	10^8 cells	C	6.0	2x30 sec
Cryptococcus neoformans	Cells	10^8 cells	C	6.0	4x30 sec
Aspergillus fumigatus	Cells	10^8 cells	C	6.0	2x30 sec
Fusarium solani	Cells	10^8 cells	C	6.0	2x30 sec

7. Troubleshooting

7.1 Degraded RNA or Lower than Expected RNA Yields

RNA purified using the FastRNA™ Pro Red Kit and analyzed by denaturing or non-denaturing agarose gel electrophoresis will appear as 2 distinct ribosomal RNA (rRNA) bands of approximately equal fluorescent intensity using ethidium bromide staining. The rRNA bands will appear in the area between 2000 and 4000 nucleotides. Messenger RNA (mRNA), which typically represents approximately less than 1% of the total cellular RNA and is heterogeneous length, will not be visible as distinct bands. rRNA is used as a marker to assess sample RNA degradation. Degraded RNA or mRNA may appear as unequal fluorescent intensity between bands, a single band may be completely lacking or a heterogeneous fluorescent smear may appear below the rRNA bands or throughout the gel lane.

Recommended precautions include cleaning all instruments and work area with RNase ERASE® (Cat. No. 112440204) prior to use. Use disposable sterile plastic containers when possible. Glassware should be thoroughly cleaned, rinsed with DEPC-H_2O and baked at 250°C for 4 hours to remove RNase. Sterile, plugged micropipettes are recommended (see 2, 3 for additional suggestions).
Certain samples may contain elevated RNase levels. Reduce the exposure time to RNase by adding RNAPro™ Solution to each sample as soon as possible following sample harvest. Process fewer samples to shorten the time before complete cellular lysis and exposure to the RNase inactivating activity of RNAPro™ Solution.

Yeast cells in log phase growth with maximal aeration and nutrients provide the highest yield and integrity RNA. Yeast cells in stationary phase, growing in oxygen or nutrient limiting conditions, stored for extended duration at room temperature or refrigerated for extended periods will contribute to reduced RNA yield and integrity.

RNAPro™ Solution can permeate samples and will protect RNA from degradation for at least 24 hours before it is processed in the FastPrep® Instrument. However, higher yields of RNA will always result when samples are homogenized immediately after the addition of RNAPro™ Solution.

Artifactual RNA degradation may occasionally occur during gel electrophoresis due to a gel that was not RNase free, running the gel at too high voltage or from using depleted running buffer. Rerun the samples with a known intact RNA sample using freshly prepared reagents.

RNA degradation may occur due to RNase contamination introduced into the DEPC-H_2O following use. If contamination is suspected, prepare fresh DEPC-H_2O in an RNase free container (2,3). RNAPro™ Solution contains RNase inactivating components and will not support active RNase contamination.

7.2 No Pellet after Ethanol Precipitation

The purified RNA may not appear as a pellet but may instead adhere to the side of the tube. The RNA may not be visible and it MAY APPEAR THAT RNA HAS NOT BEEN PURIFIED. COMPLETE THE RNA PURIFICATION per the instructions provided and confirm the RNA concentration by OD260 and integrity by gel electrophoresis. RNA adhering to the tube wall will not affect its purity, size or use in subsequent applications.

The RNA pellet may not be firmly attached to the side of the tube and may be observed floating in the solution or at the solution surface. Recentrifuge the sample in the same tube and exercise caution to not lose the pellet when removing the supernatant.

Confirm enough sample was used to isolate RNA. Since many differences exist between yeast strains and fungal species, it may be necessary to increase the amount of starting material in order to recover the desired amount of RNA. The relationship between cells per milliliter and OD600 reading is not exact, but 1 OD600 is generally between 10^7 and 10^9 cells per milliliter.

7.3 Genomic DNA Contamination

Genomic DNA contamination will appear as a high molecular weight smear on a denaturing gel or as ethidium bromide stained material in the gel loading well. In the event genomic DNA contamination occurs, treat sample with DNase according to the manufacturer's instructions.

7.4 Mucopolysaccharide / Carbohydrate Contamination

Samples containing large amounts of cellular mucopolysaccharides can be re-extracted after the initial chloroform extraction with a second chloroform extraction. Isoamyl alcohol may be included with the chloroform [CHCl3:IAA, 24:1, v:v]) to increase RNA purity. Refer also to Lithium Chloride Precipitation in the Troubleshooting section.

7.5 Lithium Chloride Precipitation

Lithium chloride (LiCl) may be used to precipitate RNA while excluding carbohydrate, DNA and proteins, including transcription inhibitors. Lithium chloride has historically been used to precipitate RNA greater than ~300 nucleotides from tRNA and 5S RNA. Lithium chloride precipitation may be incorporated into the FastRNA™ Pro Red Kit procedure: Following ethanol precipitation of the RNA and resuspension in 100 µL DEPC-H_2O, add lithium chloride to a final concentration of 2–3 M (e.g., 0.2 volumes [20 µL] RNase free 8 M lithium chloride). Add 2.5 volumes RNase free absolute ethanol (250 µL). Mix the solution and store on ice at least 2 hours. Centrifuge for 15 minutes at a minimum of 12 000 rpm at 4 °C. Remove the supernatant and wash the pellet with 75% cold RNase free ethanol. The ethanol wash step is critical to prevent LiCl inhibition of cell-free translation and in vitro transcription. Air dry and resuspend the RNA in 100 µL DEPC-H_2O.

8. Related Products

Instruments	Voltage	Cat. No.
FastPrep-24™ 5G Instrument	100-230V	116005500
FastPrep-96™ Instrument	100-230V	116010500
SuperFastPrep-1™ Instrument	100-230V	116011500
MPure-12™ Instrument	100-230V	117002200
Kits	**Size**	**Cat. No.**
FastRNA™ Spin Kit for Plant	50 preps	116041050
FastDNA™ Spin Kit for Tissue	50 preps	116540100
FastRNA™ Spin Kit for Tissue	50 preps	116540050
FastDNA™ Spin Kit for Plant	50 preps	116540200
FastDNA™ Kit	100 preps	116540400
FastDNA™ Spin Kit	100 preps	116540600
FastDNA™ Spin Kit for Soil	50 preps	116560200
FastDNA™ Spin Kit for Feces	50 preps	116570200
FastRNA™ Pro Soil-Direct Kit	50 preps	116070050
FastRNA™ Pro Soil-Indirect Kit	50 Preps	116075050
FastRNA™ Pro Green Kit (Plant & Animal)	50 preps	116045050
FastRNA™ Pro Blue Kit (Bacteria)	50 preps	116025050
FastPROTEIN™ Blue Matrix	50 preps	116550400
FastPROTEIN™ Red Matrix	50 preps	116550600

9. References

1. U.S. Patent 5,567,050. Zbloninsky et.al, Apparatus and method for rapidly oscillating specimen vessels.

2. Molecular Cloning, Sambrook and Russell. Cold Spring Harbor Laboratory Press, 3rd Edition, 2001.

3. Current Protocols in Molecular Biology, John Wiley & Sons, Inc., 2002, www.currentprotocols.com.

10. Product Use Limitation & Warranty

Unless otherwise indicated, this product is for research use only. Purchase of MP Biomedicals, Inc. products does not grant rights to reproduce, modify, or repackage the products or any derivative thereof to third parties. MP Biomedicals, Inc. makes no warranty of any kind, expressed or implied, including merchantability or fitness for any particular purpose, except that the products sold will meet our specifications at the time of delivery. Buyer's exclusive remedy and the sole liability of MP Biomedicals, Inc. hereunder shall be limited to, at our discretion, no replacement or compensation, product credits, refund of the purchase price of, or the replacement of materials that do not meet our specification. By acceptance of the product, Buyer indemnifies and holds MP Biomedicals, Inc. harmless against, and assumes all liability for, the consequence of its use or misuse by the Buyer, its employees or others, including, but not limited to, the cost of handling. Said refund or replacement is conditioned on Buyer notifying MP Biomedicals, Inc. within thirty (30) days of receipt of product. Failure of Buyer to give said notice within thirty (30) days shall constitute a waiver by the Buyer of all claims hereunder with respect to said material(s).

NOTE:

NOTE:

NOTE:

Instruction Manual

FastRNA™ Pro Red Kit

Protocol Revision #116035050-201411

Cat. No. and Size: 116035050, 50 preps

Worldwide Ordering and Technical Support

USA
Worldwide Headquarters
Tel: 800.854.0530
Fax: 800.334.6999

Europe
Phone: 00800.7777.9999
Fax: 00800.6666.8888

Australia
Tel: +61 2.9838.7422
Tel: 1800.249.998
Fax: +61 2.9838.7390
Fax: 1800.818.671

Belgium
Tel: +32 2.466.00.00
Fax: +32 2.466.26.42

Canada
Tel: 800.854.0530
Fax: 800.334.6999

China
Tel: +86 21.6281.5005
Fax: +86 21.6281.5663

France
Tel: +33 3.88.67.54.25
Fax: +33 3.88.67.19.45

Germany
Tel: 0800.426.67.337
Fax: 0800.629.67.337

India
Tel: +91 22.22631257/58
Fax: +91 22.22631259

Japan
Tel: +81 03.3808.2102
Tel: 0120.78.8020
Fax: +81 03.3808.2401

Latin America
Tel: +1 440.337.1200
Fax: +1 440.337.1180

The Netherlands
Tel: 0800.0227.416
Fax: 0800.0227.489

New Zealand
Tel: +64 9.912.2460
Fax: +64 9.838.4209

Poland
Tel: +48 22.659.58.95
Fax: +48 22.658.45.05

Russia
Tel: +7 495.661.0008
Fax: +33 3.88.67.19.45

Serbia
Tel: +381 11.242.1972
Fax: +381 11.242.1949

Singapore
Tel: +65 6775.0008
Fax: +65 6774.6146

Switzerland
Tel: +41 61.271.0007
Fax: +41 61.271.0084

United Kingdom
Tel: 0800.282.474
Fax: 0800.614.735

www.mpbio.com/sampleprep
support@mpbio.com

MP Biomedicals Europe, Tel: 00800 7777 9999 • email: info.europe@mpbio.com

MP™