Invitrogen™
life technologies

Instruction Manual

# SuperScript™ III CellsDirect cDNA Synthesis System

## Catalog Nos. 18080-200 and 18080-300

**Version A**
14 May 2004
*25-0731*

# Table of Contents

## Kit Contents and Storage

### Shipping and Storage

Kit components are shipped on dry ice and should be stored at –20°C.

### Kit Components

Catalog no. 18080-200 provides reagents for 25 reactions.
Catalog no. 18080-300 provides reagents for 100 reactions.

| Component | 25 Rxns | 100 Rxns |
|---|---|---|
| Resuspension Buffer | 250 µl | 1 ml |
| RNaseOUT™ Recombinant Ribonuclease Inhibitor (40 units/µl) | 50 µl | 200 µl |
| DNase I (1 U/µl) | 125 µl | 500 µl |
| 10X DNase I Buffer | 40 µl | 160 µl |
| 25 mM EDTA | 30 µl | 120 µl |
| Oligo(dT)$_{20}$ (50 µM) | 50 µl | 120 µl |
| 10 mM dNTP Mix | 25 µl | 100 µl |
| SuperScript™ III RT (200 units/µl) | 25 µl | 100 µl |
| 5X RT Buffer* | 150 µl | 600 µl |
| 0.1 M DTT | 50 µl | 100 µl |
| *E. Coli* RNase H (2 U/µl) | 30 µl | 100 µl |
| HeLa Total RNA (10 ng/µl) | 10 µl | 10 µl |
| Forward Control Primer (10 µM) | 10 µl | 10 µl |
| Reverse Control Primer (10 µM) | 10 µl | 10 µl |

* 5X RT Buffer composition: 250 mM Tris-HCl (pH 8.3, room temp.), 375 mM KCl; 15 mM $MgCl_2$

### Materials Supplied by the User

The following additional items are required for use with this kit:

- Coulter Counter or hemacytometer
- Microcentrifuge
- Thermal cycler
- Trypsin (for adherent cell cultures only)
- 1X cold phosphate-buffered saline PBS, without calcium or magnesium
- 0.2-ml thin-walled PCR tubes or 96-well PCR plates
- Ice
- Pipettes
- Disposable gloves

**Note**

DNA polymerase is not included in this kit. Recommended DNA polymerases and optional amplification protocols are provided starting on page 6.

# Introduction

## System Overview

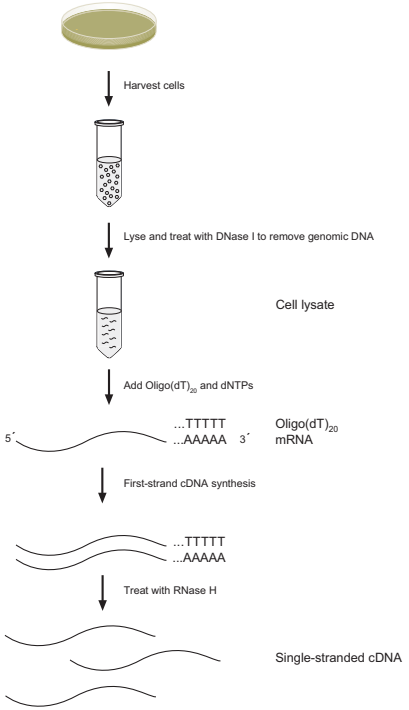
The SuperScript™ III CellsDirect cDNA Synthesis System is an optimized kit for synthesizing first-strand cDNA directly from mammalian cell lysate without first isolating the RNA. Lysis and reverse transcription are performed in the same tube, and the resulting first-strand cDNA is ready to use in cloning, PCR, or real-time quantitative PCR (qPCR) applications.

In traditional RT-PCR, RNA is first isolated from cells in a time-consuming procedure that can lead to a loss of material. Using the SuperScript™ III CellsDirect cDNA Synthesis System, the cells are lysed and the cDNA is generated from the lysate in a single tube with minimal handling and no sample loss. DNase I is added to eliminate genomic DNA prior to first-strand synthesis.

This kit has been optimized for small cell samples, ranging from 10,000 cells down to a single cell (as measured by serial dilution). The use of SuperScript™ III Reverse Transcriptase ensures high specificity and high yields of cDNA from small amounts of starting material—as little as 10 pg total RNA.

After synthesis, the first-strand cDNA can be amplified with specific primers by PCR without intermediate organic extractions or ethanol precipitations.

The diagram below outlines the procedure:

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### Advantages of the Kit

This kit has the following advantages:

- Compatible with a wide range of mammalian cell types grown under different treatment conditions
- Single-tube format minimizes reagent loss, sample loss, and handling time
- Total lysate volume is used in first-strand cDNA synthesis reaction, providing greater yields with a limited number of cells and allowing for detection of rare transcripts
- SuperScript™ III Reverse Transcriptase, with reduced RNase H activity and higher thermal stability, produces high yields of cDNA in the first-strand synthesis reaction, for greater sensitivity and enhanced detection of rare transcripts
- Generates high-quality cDNA for use in a variety of applications, including cloning, PCR, and real-time qPCR
- Simple protocol takes less than 2 hours

### SuperScript™ III RT

SuperScript™ III Reverse Transcriptase is an engineered version of M-MLV RT with reduced RNase H activity and increased thermal stability. The enzyme can be used to synthesize first-strand cDNA at temperatures up to 55°C, providing increased specificity, higher yields of cDNA, and more full-length product than other reverse transcriptases.

Because SuperScript™ III RT is not inhibited significantly by ribosomal and transfer RNA, it can effectively synthesize first-strand cDNA directly from total RNA. The concentration of SuperScript™ III RT in this system has been optimized to synthesize first-strand cDNA from total RNA in cell lysate.

### Control RNA and Primers

The control RNA provided with this system consists of HeLa Total RNA (10 ng/µl). The Forward Control Primer and Reverse Control Primer provided with this kit are designed from the human GAPDH gene and produce a 1.18-kb PCR product.

### Quality Control

This kit was verified in an end-point RT-PCR reaction using a serial dilution of HeLa cells and GAPDH primers, yielding a 1.18 kb PCR product. No template controls and negative reverse transcriptase controls were also prepared. Results were confirmed by gel electrophoresis.

# Methods

## Lysing Cells

### Introduction

In this step, you lyse your cells in Resuspension Buffer and perform a DNase I digestion to remove genomic DNA from the sample.

### Cell Types and Density

This kit has been optimized for small cell samples, ranging from 1 to 10,000 cells. The performance of this kit was verified using several different mammalian cell lines, including HeLa, COS-7, 293, Jurkat, CV1, and K562. Cells may be grown under variety of conditions and treatments. Any type of culture vessel can be used.

### Important

- We recommend using a maximum of 10,000 cells per reaction. Higher numbers of cells may inhibit reverse transcription and result in reduced yields and/or truncated cDNA product.
- Make sure that all solutions and equipment that come in contact with the cells are sterile. Always use proper sterile technique and work in a laminar flow hood when handling cells.

### Required Materials

The following materials are provided by the user:

- Mammalian cell cultures in growth media
- Coulter Counter or hemacytometer
- Centrifuge (for pelleting cells)
- Incubator, water bath, or thermal cycler preheated to 75°C
- Trypsin (for adherent cell cultures only)
- 1X cold phosphate-buffered saline (PBS), without calcium or magnesium
- 0.2-ml thin-walled PCR tubes or 96-well PCR plates
- Ice
- Pipettes

The following materials are provided in the kit:

- Resuspension Buffer
- RNaseOUT™ (40 U/µl)
- DNase I, Amplification Grade (1 U/µl)
- 10X DNase I Buffer
- EDTA, 25 mM
- Optional: Control HeLa Total RNA

### Control Reaction

For the control reaction, use 1 µl of the HeLa Total RNA provided in the kit instead of cell lysate.

*Continued on next page*

**Note**

All steps should be performed on ice, and reagents should be chilled and/or thawed immediately prior to use.

The incubator should be **preheated** to 75°C.

### Lysing Adherent Cells or Cells in Suspension

Use the following lysis procedure for adherent cell cultures in vessels larger than 24-well plates. For cells in suspension, skip Steps 1–4 and proceed to Step 5 below.

1. Add enough trypsin to cover the adherent cells in your tissue culture dish, plate, or flask (e.g., for a 10-cm dish, use ~1 ml; for a T75 flask, use ~3 ml).
2. Incubate for 5 minutes at room temperate or in a 37°C incubator.
3. Check for cell detachment under a microscope. If cells have not detached, gently tap the disk or flask to dislodge the cells, or let the cells incubate longer, checking them every minute under a microscope.
4. When all the cells have detached, add serum-containing media to a final volume of 10 ml (for 6- and 12-well plates, add a 1X–2X volume of media). Note that the media must contain serum to inactivate the trypsin.
5. Pipet the cells gently up and down to mix, and then transfer the cell suspension to a centrifuge tube.
6. Spin the cells at 200 × *g* for 5 minutes to pellet.
7. Aspirate the media and wash the cell pellet with 5–10 ml of 1X cold PBS.
8. Spin the cells at 200 × *g* for 5 minutes to pellet.
9. Aspirate the PBS and resuspend the pellet in 500 µl to 1 ml of 1X cold PBS. Mix the cell solution gently.
10. Collect a small aliquot to verify that the cells at the desired concentration. Determine cell density electronically using a Coulter Counter or manually using a hemacytometer chamber.
11. Adjust the cell density using cold PBS so that it falls within the range of 1–10,000 cells/µl. Count the cells again to verify cell concentration.
12. To a 0.2-ml thin-walled PCR tube or plate well **on ice**, add 1 µl of RNaseOUT™ (40 U/µl) and 10 µl of Resuspension Buffer.
13. Transfer 1–2 µl of cells (<10,000 cells) to the PCR tube/well.

    **Control:** For the control reaction, add 1 µl of the Control HeLa Total RNA to the PCR tube or plate well instead of cell lysate.
14. Transfer the tube/plate to an incubator, water bath, or thermal cycler preheated to 75°C and incubate for 10 minutes. **Control:** For the control reaction, incubate for 3 minutes.
15. After incubation, spin briefly to collect the condensation and proceed to **DNase I Digestion,** page 4.

*Continued on next page*

### Lysing Cells in Tissue Culture Wells

**Note:** Seed cells in tissue culture wells so that 10 µl of resuspended cells will yield the desired concentration.

For adherent cells grown in tissue culture wells (i.e., in 24-well, 48-well, or 96-well plates), perform the following lysis procedure.

1. Aspirate the media in each well and wash each well with 1X cold PBS. Aspirate the PBS.
2. Add Resuspension Buffer to each well. For 96-well plates, add at least 10 µl of buffer to each well. For 24-well plates, add at least 100 µl of buffer to each well. The buffer should cover the cells in the well.
3. Incubate the plates on ice for up to 10 minutes. During that period, tap the plate periodically and check the cells under a microscope every 2–3 minutes to see whether they have detached or burst.
4. After 10 minutes, gently pipet the cells up and down to dislodge the remaining attached cells. Count the cells or estimate their density based on the seeding density (10 µl should contain <10,000 cells).
5. Transfer 10 µl of the cell suspension to a 0.2-ml thin-walled PCR tube or plate well.

   **Control:** For the control reaction, add 10 µl of Resuspension Buffer to a PCR tube or plate well, and then add 1 µl of Control HeLa Total RNA.
6. Add 1 µl of RNaseOUT™ (40 U/µl) to the PCR tube/well.
7. Transfer the tube/plate to an incubator or thermal cycler preheated to 75°C and incubate for 10 minutes. **Control:** For the control reaction, incubate for 3 minutes.
8. After incubation, spin briefly to collect the condensation, and proceed to **DNase I Digestion,** page 4.

*Continued on next page*

### DNase I Digestion

In this step, you treat the cell lysate with DNase I to degrade any contaminating DNA.

1. Place each tube/plate from Step 15, page 2, or Step 8, page 3, on ice, and add the following:

| Component | Amount |
|---|---|
| DNase I, Amplification Grade (1 U/µl) | 5 µl |
| 10X DNase I Buffer | 1.6 µl |

2. Mix by gently pipetting up and down, and spin briefly to collect the contents.
3. Incubate for 5 minutes at room temperature. **Note:** A longer incubation time (up to 10 minutes) may be used for larger samples (>1,000 cells). However, incubation times exceeding 10 minutes can greatly reduce cDNA yield.
4. Spin briefly, and add 1.2 µl of 25 mM EDTA to each tube/well on ice. Mix by gently pipetting up and down, and spin briefly to collect the contents.
5. Incubate at 70°C for 5 minutes.
6. Spin briefly and proceed to **First-Strand cDNA Synthesis,** page 5.

## First-Strand cDNA Synthesis

### Required Materials

The following materials are provided by the user:

- Thermal cycler preheated to 70°C
- Ice
- Pipettes

The following materials are provided in the kit:

- Oligo(dT)$_{20}$ (50 µM)
- 10 mM dNTP Mix
- 5X RT Buffer
- RNaseOUT™ (40 U/µl)
- SuperScript™ III RT (200 U/µl)
- 0.1 M DTT
- RNase H (2 U/µl)

### First-Strand cDNA Synthesis

1. Place each tube from **DNase I Digestion,** Step 6, page 4, on ice, and add the following:

| Component | Amount |
|---|---|
| Oligo(dT)$_{20}$ (50 mM) | 2 µl |
| 10 mM dNTP Mix | 1 µl |

2. Mix by gently pipetting up and down, and spin the tube briefly to collect the contents.
3. Incubate the tube at 70°C for 5 minutes. Spin the tube briefly to collect the condensation.
4. Place the tube on ice for 2 minutes, and then add the following:

| Component | Amount |
|---|---|
| 5X RT Buffer | 6 µl |
| RNaseOUT™ (40 U/µl) | 1 µl |
| SuperScript™ III RT (200 U/µl)* | 1 µl |
| 0.1 mM DTT | 1 µl |

*For negative RT controls, use 1 µl of sterile, distilled water instead of SuperScript™ III RT

5. Mix by gently pipetting up and down, and spin the tube briefly to collect the contents.
6. Transfer the tube to a thermal cycler preheated to 50°C. Incubate for 50 minutes.
7. Inactivate the reaction at 85°C for 5 minutes.
8. Add 1 µl of RNase H (2 U/µl) to each tube and incubate at 37°C for 20 minutes. **Note:** This step is optional if you are amplifying short targets (<1.0 kb) in end-point PCR; it is **required** for qPCR.
9. Chill the reaction on ice.
10. Store the single-stranded cDNA at –20°C, or proceed directly to PCR amplification.

# PCR and Quantitative PCR

## Introduction

The first-strand cDNA generated using this kit can be used directly in PCR or real-time quantitative PCR (qPCR) without additional purification. This section provides example protocols for PCR and high-fidelity PCR.

## PCR and Real-Time qPCR Kits

The following PCR enzymes and qPCR kits are available separately:

| Product | Size | Cat. No. |
|---|---|---|
| Platinum® *Taq* DNA Polymerase | 100 rxns | 10966-018 |
| | 250 rxns | 10966-026 |
| | 500 rxns | 10966-034 |
| | 5000 rxns | 10966-083 |
| Platinum® *Taq* DNA Polymerase High Fidelity | 100 rxns | 11304-011 |
| | 500 rxns | 11304-029 |
| | 5000 rxns | 11304-102 |
| Platinum® Quantitative PCR SuperMix-UDG | 100 rxns | 11730-017 |
| | 250 rxns | 11730-025 |
| Platinum® SYBR® Green qPCR SuperMix-UDG | 100 rxns | 11733-038 |
| | 250 rxns | 11733-046 |

## PCR Enzymes

For amplifying the first-strand cDNA generated using this kit, we recommend Platinum® *Taq* DNA Polymerase for targets < 1.0 kb and Platinum® *Taq* DNA Polymerase High Fidelity for targets > 1.0 kb.

**Platinum® *Taq* DNA Polymerase** is recombinant *Taq* DNA polymerase complexed with proprietary Platinum® antibodies that block polymerase activity at ambient temperatures. Activity is restored after the denaturation step in PCR cycling at 94°C, providing an automatic "hot start" for *Taq* DNA polymerase in PCR. Hot starts in PCR provide increased sensitivity, specificity, and yield, while allowing assembly of reactions at room temperature. The use of Platinum® antibodies helps reduce PCR optimization requirements, reaction set-up and handling time, and contamination risk, thereby improving PCR results for templates up to 5 kb.

**Platinum® *Taq* DNA Polymerase High Fidelity** is a mixture of recombinant *Taq* DNA polymerase, *Pyrococcus* species *GB-D* polymerase, and Platinum® *Taq* antibody. Platinum® antibody complexes with *Taq* DNA polymerase and inhibits activity at ambient temperatures, allowing room-temperature setup. Activity is restored after the PCR denaturation step at 94°C, providing an automatic "hot start" for the enzyme and increasing specificity, sensitivity, and yield.

*Pyrococcus* species *GB-D* polymerase is a proofreading enzyme that possesses a 3′ to 5′ exonuclease activity. The enzyme mixture in Platinum® *Taq* DNA Polymerase High Fidelity results in a six-fold increase in fidelity over *Taq* DNA polymerase alone and allows amplification of simple and complex DNA templates over a large range of target sizes, up to 12 kb with no optimization.

**Note**

Since PCR is a powerful technique capable of amplifying trace amounts of DNA, take all appropriate precautions to avoid sample contamination.

Annealing and extension conditions are dependent on primer $T_m$, and should be determined independently for each reaction.

If PCR efficiency is not optimal, repeat the reaction with a primer titration from 100 to 500 nM (final conc.) in 100-nM increments.

### PCR — Targets Up to 1 kb

The following protocol uses Platinum® *Taq* DNA Polymerase in a standard PCR reaction. Adjust the reaction size as needed. Optimal reaction conditions—including incubation times and temperatures, and concentrations of enzyme, primers, and $MgCl_2$—may vary.

**Note:** A concentration of 1.5 mM $MgCl_2$ is sufficient for most targets. For further optimization, prepare a titration from 1.5 mM to 3 mM in 0.25-mM increments.

1. Add the following components to a sterile 0.2- or 0.5-ml PCR tube or plate well at room temperature or on ice. For multiple reactions, prepare a master mix of common components.

| Components | Volume | Final Conc. |
|---|---|---|
| 10X PCR Buffer, Minus Mg | 5 µl | 1X |
| 10 mM dNTP mixture | 1 µl | 0.2 mM each |
| 50-mM $MgCl_2$ | 1.5 µl | 1.5 mM |
| Sense primer (10 µM) | 1 µl | 0.2 µM |
| Antisense primer (10 µM) | 1 µl | 0.2 µM |
| cDNA from Step 10, page 5 | 2 µl | — |
| Platinum® *Taq* DNA Polymerase | 0.4 µl | 2.0 units* |
| Autoclaved, distilled water | to 50 µl | n/a |

   *2.0 units are recommended for amplifying cDNA from the CellsDirect kit. In some cases, more enzyme may be required (up to 2.5 units).

2. Mix contents of the tubes and overlay with 50 µl of mineral or silicone oil, if necessary.
3. Cap the tubes and centrifuge briefly to collect the contents.
4. Incubate tubes in a thermal cycler at 94°C for 30 seconds to 2 minutes to denature the template and activate the enzyme.
5. Perform 30–40 cycles of PCR amplification as follows:

| | |
|---|---|
| Denature | 94°C for 15–30 seconds |
| Anneal | 55–65°C for 30 seconds |
| Extend | 72°C for 1 minute per kb |

6. Maintain the reaction at 4°C after cycling. The samples can be stored at -20°C until use.
7. Analyze the products by agarose gel electrophoresis and visualize by ethidium bromide staining. Use appropriate molecular weight standards.

*Continued on next page*

## PCR — Targets Above 1 kb

The following protocol uses Platinum® *Taq* DNA Polymerase High Fidelity in a standard PCR reaction. Adjust the reaction size as needed. Optimal reaction conditions—including incubation times and temperatures, and the concentrations of Platinum® *Taq* DNA Polymerase High Fidelity, primers, $MgSO_4$, and template DNA—may vary.

**Note:** A concentration of 2 mM $MgSO_4$ is sufficient for most targets. For further optimization, prepare a titration from 2 mM to 4 mM in 0.25-mM increments.

1. Add the following components to a sterile 0.2- or 0.5-ml PCR tube or plate well at room temperature or on ice. For multiple reactions, prepare a master mix of common components.

| Component | Volume | Final Conc |
|---|---|---|
| 10X High Fidelity PCR Buffer | 5 µl | 1X |
| 10-mM dNTP mixture | 1 µl | 0.2 mM each |
| 50-mM $MgSO_4$ | 2 µl | 2 mM |
| Sense primer (10 µM) | 1 µl | 0.2 µM |
| Antisense primer (10 µM) | 1 µl | 0.2 µM |
| cDNA from Step 10, page 5 | ≥1 µl | — |
| Platinum® *Taq* High Fidelity | 0.2 µl | 1.0 unit* |
| Autoclaved, distilled water | to 50 µl | Not applicable |

   *1.0 unit is sufficient for amplifying most targets. In some cases, more enzyme may be required (up to 2.5 units).

2. Mix contents of the tubes and overlay with 50 µl of mineral or silicone oil, if necessary.
3. Cap the tubes and centrifuge briefly to collect the contents.
4. Incubate tubes in a thermal cycler at 94°C for 30 seconds to 2 minutes to denature the template and activate the enzyme.
5. Perform 30–40 cycles of PCR amplification as follows:

| | |
|---|---|
| Denature | 94°C for 15–30 seconds |
| Anneal | 55–65°C for 30 seconds |
| Extend | 68°C for 1 minute per kb |

6. Maintain the reaction at 4°C after cycling. The samples can be stored at -20°C until use.
7. Analyze the products by agarose gel electrophoresis and visualize by ethidium bromide staining. Use appropriate molecular weight standards.

## Real-Time qPCR

We recommend Platinum® Quantitative PCR SuperMix-UDG for optimal results in real-time qPCR using LUX™ Primers or TaqMan® probes. We recommend Platinum® SYBR® Green qPCR SuperMix-UDG for optimal results using SYBR® Green I binding dye. See these product manuals for detailed protocols using first-strand cDNA in real-time qPCR on different instruments.

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## PCR — Control Reaction

The following protocol uses Platinum® *Taq* DNA Polymerase and the Control Primers provided in the kit in a standard PCR reaction.

1. Prepare a PCR mixture for each control reaction from Step 10, page 5. For each control reaction, add the following to a sterile 0.2- or 0.5-ml PCR tube or plate well at either room temperature or on ice:

| Component | Volume |
|---|---|
| DEPC-treated water | 38.1 µl |
| 10X PCR buffer minus $Mg^{++}$ | 5 µl |
| 50 mM $MgCl_2$ | 1.5 µl |
| 10 mM dNTP mix | 1 µl |
| Forward Control Primer (10 µM) | 1 µl |
| Reverse Control Primer (10 µM) | 1 µl |
| cDNA from control RNA/ negative RT control, Step 10, page 5 | 2 µl |
| Platinum® *Taq* DNA polymerase (5 units/µl) | 0.4 µl |
| final volume | 50 µl |

2. Mix the contents of the tube. Centrifuge briefly to collect the reaction components.
3. Place reaction mixture in preheated (94°C) thermal cycler. Perform an initial denaturation step: 94°C for 2 min.
4. Perform 40 cycles of PCR:

| | |
|---|---|
| Denature | 94°C for 15 sec |
| Anneal | 60°C for 30 sec |
| Extend | 72°C for 1 min |

   **Note:** For slow-ramping thermal cyclers, follow manufacturer's directions.
5. Upon completion, maintain reactions at 4°C.
6. Analyze 10 µl of each sample using agarose gel electrophoresis and ethidium bromide staining. A 1.18-kb band corresponding to at least 25 ng of product should be visible for the control sample. No band should be visible for the negative RT control sample.

## Troubleshooting

| Problem | Possible Cause | Suggested Solution |
|---|---|---|
| No bands after electrophoretic analysis of amplified products | Procedural error | Confirm that all steps were followed. Use the Control RNA to verify the efficiency of the first-strand reaction (see the next page on troubleshooting with the Control RNA). |
| | RNA is degraded | Add control total HeLa RNA to sample to determine if RNase is present in the first-strand reaction.<br>Confirm that RNaseOUT™ was added at the appropriate steps in the protocol.<br>A longer DNase I digestion can hydrolyze the RNA in the sample. Use a digestion time of <10 minutes.<br>Maintain aseptic conditions to prevent RNase contamination. |
| | Target mRNA contains strong transcriptional pauses | Use random hexamers (Cat. no. 48190-011) instead of oligo$(dT)_{20}$ in the first-strand reaction.<br>Maintain an elevated temperature after the annealing step.<br>Increase the temperature of first-strand reaction (up to 55°C).<br>Use PCR primers closer to the 3´ terminus of the target cDNA. |
| | Too much first-strand product was used in PCR | Use no more than 5 µl of the first-strand product in PCR. |
| Unexpected bands after electrophoretic analysis | Contamination by genomic DNA | Do not omit the DNase Digestion step on page 4. For larger samples (>1,000 cells), use a longer DNase I incubation time, i.e., up to 10 minutes.<br>Design primers that anneal to sequence in exons on both sides of an intron or exon/exon boundary of the mRNA to of amplified allow differentiation between amplification of cDNA and products potential contaminating genomic DNA.<br>To test if products were derived from DNA, prepare a negative RT control. |
| | Nonspecific annealing of primers | Vary the annealing conditions. Use Platinum® *Taq* DNA Polymerase for automatic hot-start PCR.<br>Optimize magnesium concentration for each template and primer combination. |

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## Related Products

| Product | Size | Cat. No. |
|---|---|---|
| **Products for Analysis:** | | |
| E-Gel® Pre-cast Agarose Gels | | |
| 0.8% Starter Pak | 9 gels and base | G5000-08 |
| 1.2% Starter Pak | 9 gels and base | G5000-01 |
| 2% Starter Pak | 9 gels and base | G5000-02 |
| 4% Starter Pak | 9 gels and base | G5000-04 |
| UltraPure™ Agarose | 100 g | 15510-019 |
| | 500 g | 15510-027 |
| UltraPure™ Agarose 1000 | 100 g | 10975-035 |
| 100-bp DNA Ladder | 50 µg | 15628-019 |
| 123-bp DNA Ladder | 100 µg | 15613-011 |
| | 250 µg | 15613-029 |
| 1-Kb Plus DNA Ladder | 250 µg | 10787-018 |
| | 1,000 µg | 10787-026 |
| **Enzymes for Amplification:** | | |
| Platinum® *Taq* DNA Polymerase | 100 reactions | 10966-018 |
| | 250 reactions | 10966-026 |
| | 500 reactions | 10966-034 |
| | 5000 reactions | 10966-083 |
| Platinum® *Taq* DNA Polymerase High Fidelity | 100 reactions | 11304-011 |
| | 500 reactions | 11304-029 |
| | 5,000 reactions | 11304-102 |
| Platinum® Quantitative PCR SuperMix-UDG | 100 rxns | 11730-017 |
| | 250 reactions | 11730-025 |
| PCR SuperMix High Fidelity | 100 reactions | 10790-020 |
| Platinum® PCR SuperMix | 100 reactions | 11306-016 |

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